The Commercial Car Journal

VOLUME XXI | PHILADELPHIA, JUNE 15, 1921 | NUMBER 4

WHAT SERVICE MEANS TO THE DEALER

How Many Dealers Are Sold on the Advantages Derived by Giving Adequate Service?

How Can the Dealer Make His Parts and Service Departments Show a PROFIT?

EVER since selling motor trucks has become a merchandising problem instead of simply an order taking proposition, many dealers are confronted with a problem which incidentally cannot be solved by any known "rule of thumb" method. That particular problem is that of taking care of the customer after he has purchased a truck. The big dealer or distributor who has been in business for a number of years and who has been "through the mill" so to speak, will appreciate the remarks made in the paragraphs following, more thoroughly than the new dealer, simply because he has learned what many dealers have still to learn, that the motor truck business is not a game, not a get-rich-quick scheme and not a business in which shyster methods will long endure.

Perhaps the one thing which many dealers do not thoroughly appreciate is that SERVICE and SALES are inseparable. The Sales Department cannot exist separately without functioning harmoniously with the Service Department and vice versa. Service is no longer an extra. It is not a trading-stamp proposition.

All the promises of monthly free inspection and free service mean nothing to the average truck buyer. Why? Because he has heard so much of free service in the past and has been so thoroughly disappointed that he is not willing to take any further chances. **He wants real service and he is willing to pay for it.**

The business man, be he a merchant, farmer or banker, fully realizes that these days you can't get anything for nothing. So why lead the buyer to believe that he can expect something which cannot be equitably delivered? The evil of promising free service is far reaching. It reflects upon the integrity of the Sales Department where free service propaganda originated. It is easy for the Sales Department to make promises, but can the Service Department fulfill those promises without eventually eating up all the profits which the dealer should have realized from his sales? We will let the dealer answer this for himself. For the dealer who persists in giving free service, all we can say is that he is hopeless.

What About Paid Service?

How many dealers thoroughly appreciate the necessity of rendering paid service?

Why is it that some dealers are selling more trucks than others?

Why is it that some truck service departments show a profit and others do not?

The second and third questions can be answered in a few words—those dealers **are giving** intelligent and prompt service. They have realized that the selling of trucks is not only a business of sales, but that giving adequate SERVICE is the paramount object of the successful truck dealers. **THEY ARE PLACING SERVICE AHEAD OF SALES.**

We shall devote our attention, therefore, to the dealer who does not realize the importance of service. Before going any further let us state that the Editorial Department has in its files dozens of letters from truck manufacturers commenting on the various phases of the service problem. In all these letters much general information is imparted on the necessity of giving adequate service, but there is one condition which exists that seems to puzzle the manufacturers as to **HOW THEY CAN MAKE THE DEALER REALIZE THAT THE VERY LIFE OF HIS BUSINESS AND HIS FUTURE SUCCESS DEPENDS UPON THE SERVICE WHICH HE RENDERS.**

That manufacturers have spent thousands of dollars in perfecting their service departments is a well-known fact, and that there are many dealers who ignore the helps which the manufacturers are giving them, is also a fact.

If the manufacturer is willing to spend his money for this purpose, surely the dealer should do his part in executing the suggestions advanced by the manufacturer as far as it is physically possible, and as far as his profits will permit.

The dealer who is linked up with a reputable truck manufacturer who is honestly trying his utmost to help his dealers become better truck merchants, better salesmen, and who is also trying to uphold the reputation that his product has gained, should give the suggestions offered by the manufacturers his earnest consideration. He should lose no opportunity to faithfully co-operate with the manufacturers.

But what about the dealer who continuously passes up the manufacturer's suggestions; who throws the factory's literature into the waste basket; who thinks he knows how to run his business without any factory interference. Is he acting squarely? Perhaps the factory has included some very pertinent suggestions as to how parts should be ordered, or has made changes in parts numbers. Mr. Dealer does not worry about such trifles. But the next time he orders parts he may not get them promptly, or the wrong parts arrive. Immediately he blames the factory. But, when the storm is over, he may be convinced that it is all his own fault.

All the preaching in the world will not change the habit of the individual, unless he makes up his mind to do it himself, —unless he ACTS.

It's the same with giving service. Some dealers, when taking on a line of trucks, promise unfailing co-operation with the factory. The factory is led to believe that the dealer will lay in a suitable stock of parts up to the amount called for in the sales agreement or (to use a much abused word) contract—but what actually happens is another story.

The dealer feels that he can do without a stock of parts and thinks he can employ his capital better in another direction. The result is that he drifts along this way for some time and gradually convinces himself that he can carry on this way indefinitely. If some urgent case is brought to his attention for a part, he resorts to the telephone, telegraph or letter writing. The owner in the meantime is stood off with all kinds of excuses, all of which reflect upon the factory and the product. It takes time to get parts from the factory and in the interim the owner

Shake! Let's Get Together on This

begins to wonder where all the **service is coming from the dealer howled about when he sold the truck.**

No, this isn't an exceptional case—it happens every day.

IS IT THE DEALER'S FAULT THAT THESE CONDITIONS EXIST?

Such conditions could not exist if the contract were more specific, and if the factory had a better line on the dealer before allotting him a territory. This particular phase of the business is treated elsewhere in this issue.

How Can the Dealer Improve His Service Facilities?

The function of the service department is easily summed up in a few words—to render assistance promptly and at the least possible cost. Every truck dealer should know that **service on a truck is a different proposition** from passenger car service.

The passenger car owner can be stood off for a few days if it is absolutely necessary, because a part is on its way from the factory. The owner will grumble to be sure; he has a perfect right to do so.

But, with a truck laid up days and perhaps weeks for a measly part which the **dealer should have in stock**—there is **absolutely no excuse.** How can this dealer expect to sell this customer in the future?

Why talk about repeat orders or resales, when one of the first things the dealer does is to give his future business relations with the customer a black-eye by not being able to take care of him when a breakdown occurs.

The foregoing philosophical advice may be considered by some dealers as old stuff. It is old stuff to us and to many dealers who have visualized what service means. It's the very things in business to which some of us pay little attention that are the means of making fortunes for others. We do not surmise that many dealers are going to become wealthy from the profits made by the service department—in fact, we have heard of only a few who have made any execptional profits.

But there is a profit to be made in motor truck service, provided the dealer follows honest - to - goodness merchandising methods.

1. The dealer must sell himself on the fact that SERVICE MUST BE GIVEN on trucks.

There isn't a truck built that does not sooner or later require service.

2. The most successful truck manufacturers today are the ones who are insisting that the customer receives adequate service.

Even those manufacturers are continuously encouraging their dealers to improve the service end.

3. No dealer can hope to survive who will not give his service department first consideration and carry a suitable quantity of at least the most needed replacements.

4. No dealer can refute the statement that his SERVICE DEPARTMENT is the one factor in his business which makes for satisfied or dissatisfied customers. IT IS THE DEALER'S GREATEST SALES ASSET.

5. Last, but not least, and here is the nucleus to the whole service problem, sell your truck **at its list price.** Think it over!

Which leads us right to the vital point —how can you improve your service department?

By starting in with your sales department.

First of all, let it be understood that all promises made about service should be made in black and white.

Verbal promises are trouble breeders.

We know of many dealers—recent entrants in the field—who have just a handful of parts somewhere in the back room,

whose salesman can talk service as glibly as a salesman connected with the big dealer down the street who has $50,000 or more invested in parts. The salesman who thinks he can get away with such tactics is kidding himself and the dealer he represents.

If your stock of parts is way below standard, don't brag about service—rather see to it that the shelves or bins are filled promptly. A well stocked parts room is a comforting vision to the prospect. He will not need any further evidence that you know your business, and that you're selling a reputable proposition.

The second important consideration in which the salesman can function is to keep close tabs on the vehicles that enter the repair shop.

Many sales can be made as the result of close co-operation between the Sales Department and the service manager. A truck that is a frequent visitor in the service department can be perhaps replaced by a new one. Sometimes a little energetic salesmanship goes a long way. There are many potential prospects for new trucks in the repair shop.

In conclusion, let us state that unfortunately there are in existence many service stations that are such in name on'y. There is much room for improvement.

The reason why many shops are not a paying proposition can be attributed to lack of capital. No dealer can expect to become a success in the motor truck business unless he is willing to invest a certain amount of his capital in parts and shop tools.

The foregoing refers particularly to the dealer who has not as yet found his way. The dealer who has a fairly well equipped shop and whose stock of parts is adequate, we refer to the articles in this number. Various phases of the service work are taken up separately and which we trust will inspire the dealer to build up his service department and thus directly increase his sales on motor trucks.

The Potential Market for Truck Replacement Parts in 1921

Service Sales Will Eclipse Truck Sales in Many Cases

By J. H. COLLINS*

A VERY live truck dealer in America has come to a realization of the fact that 1921 will be the biggest year for the service department in the history of the industry. Two factors have operated to bring about such a condition. In the first place, there are more trucks in operation than during any previous year. In the second place, the present period of industrial retrenchment calls for the salvage of old trucks, which otherwise would be slated for the scrap heap. Temporary business depression will result in a longer period of life for present transportation facilities, and a larger expenditure of money for service in lieu of expenditures for new motor equipment.

Some dealers refuse to see more than one side of the present dull period in the truck business. They are unable to realize that fewer sales of new trucks mean more service sales to keep present equipment in workable condition. They do not see that the service department may be made to function at this time as the "bread winner" of the business, if service is merchandised as consistently and aggressively as are motor vehicles during more normal times.

There were 963,616 commercial cars registered in the United States at the beginning of the year. If business conditions were normal, nearly 115,000 of these would be scrapped during the year. The present stagnation in many lines of industry, however, will result in the retention in service of many trucks, which otherwise would go to the scrap heap. Probably the number of trucks scrapped this year will be about 50 per cent of normal. Those trucks retained beyond their normal life will obviously require thorough overhauling and the replacement of many parts which have become badly worn. This in itself will add appreciably to service requirements this year.

Not counting small adjustments and repairs on new trucks built in 1921, therefore, there will be about 900,000 commercial cars requiring major service of some sort during the present year. The value of labor and parts required for adequate service on these trucks will be nearly $180,000,000. When it is calculated that this is approximately 70 per cent of the value of all new trucks built this year, the possibilities in service sales assumes a new significance to the dealer who has been considering service as a side issue in his business. This year "the tail may wag the dog" with a vengeance.

*Manager Chilton Commercial Survey Department.

Some Replacement Items for 1921 in Truck Field

Brake Lining	$10,087,000
Batteries	2,790,000
Bearings	9,000,000
Piston Rings	3,800,000
Pistons	3,115,000
Springs	7,508,000
Nuts, Bolts and Small Supplies	5,500,000

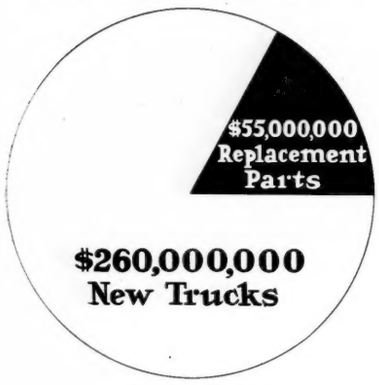
Total value of Parts which will be needed for Replacement on Trucks in 1921, $55,000,000.

Truck Service Versus Passenger Car Service

Except in the larger cities, truck service is rendered principally in repair shops handling both automobiles and trucks. Such a condition makes it difficult, if not impossible, to consider some features of truck service, except as part of a system of service designed for both types of motor vehicles. A proper conception of the size, character, and stability of the repair business in the United States, therefore, can be obtained only if we consider, for the time being, the business as a whole.

There are at the time of writing over 45,000 repair stations for motor vehicles in the United States. Of this number, 12,150 handle fewer than 25 cars and trucks per month for major repairs; 10,350 handle 25 to 50 motor vehicles per month; 7,650 handle 50 to 100 vehicles per month;

Total Truck Sales in 1921



$315,000,000

5,850 handle 100 to 150 vehicles per month, and 9,000 repair over 150 cars and trucks per month. The fact that over one-fifth of all repair stations handle 150 or more motor vehicles per month indicates the substantial character of the service station of today.

It is a matter of interest to note that more than half of the repair stations in the United States are located in towns having a population of less than 10,000. More specifically, 4,050 service stations are located in cities having a population over 500,000, 4,100 are in cities having a population between 100,000 and 500,000, 8,100 are in cities with a population between 10,000 and 100,000, and 28,750 are in towns having a population less than 10,000. It must be explained, however, that the number of motor vehicles repaired in the larger cities is somewhat greater than might be indicated by the above figures, since large service stations in the principal cities average a greater number of cars per day.

While it is true that service stations caring for trucks exclusively are, as a rule, confined to the larger cities, it must be remembered that many so-called passenger cars service stations derive a very substantial annual revenue from truck service. In fact, some large stations servicing both types of motor vehicles handle more trucks each year than do some of the smaller exclusive truck service stations. Investigation indicates that nearly 14,000 repair stations are offering some sort of truck service, even though the majority of these specialize on automobile service.

In considering the relation between truck and passenger car service, an interesting analogy between the two branches of the motor vehicle industry may be drawn. Passenger cars in use today outnumber trucks more than eight to one. As a matter of fact, this ratio has consistently held since the establishment of the truck industry, as the following table will show:

Table Showing Corresponding Production Years

Passenger Cars	Trucks
1904— 21,281	1912— 22,000
1909—127,731	1917—128,157
1910—181,000	1918—227,250
1911—199,319	1919—316,364
1912—356,000	1920—350,000

A study of the table herewith shows truck production has been constantly running about eight years behind passenger car production so far as totals are concerned. Taking into consideration the eight-year period in each case, it will be seen that the production schedules check closely, except where the temporary depression which took place in the passenger car industry in 1910 was reflected in the production schedule for 1911. If we assume that the history of the truck industry will continue to follow the history of its predecessor, the passenger car business, it can be seen that truck service within the next five years will assume formidable proportions.

Those repair stations now rendering satisfactory service to trucks are laying the foundation for a future business which may directly rival that now secured in the automobile field. The small profit of today may be the big business of tomorrow. Even now, truck service is becoming so important in some of the smaller industrial centers that it is rendered by repair shops, which gradually have come to cater very largely to this type of work.

Heretofore we have compared truck and passenger car service on the basis of the number of each type of vehicle in use. Such a basis of comparison is hardly fair to the commercial car. Trucks must run under adverse operating conditions, frequently with careless drivers, over rough roads, and with comparatively heavy loads. Such a combination of circumstances makes frequent service imperative, and puts the truck in the repair shop more often than the passenger car. Then, too, replacement parts for trucks are as a rule heavier and rather more costly than for passenger cars, and the installation of these parts takes longer. Hence, unit for unit, the truck offers a greater profit to the repair shop than does the automobile.

The Potential Market for Replacement Parts

It previously has been pointed out in this article that the total value of labor and parts required this year for truck service will be nearly $180,000,000. It might be illuminating to consider briefly at this point some individual items in the replacement market.

It is an obvious fact that the market for brake lining in the replacement field is much larger than for factory equipment. Statistics perhaps may make this clearer. Brake lining is replaced on an average of one and one-half times each year on trucks. This means that Ford trucks in use will require for replacement 3,510,000 feet of brake lining, costing at wholesale $702,000 for replacement this year. Other trucks will require for replacement 12,505,000 feet of brake lining, worth $9,385,000. The total wholesale value of brake lining required for replacement this year will be about $10,087,000.

Battery ignition has become quite important in the truck field during the past three years because of the growing popularity of the so-called light delivery car. The life of a storage battery in truck service is rather less than in passenger car service. A fair average life for a truck battery is about fifteen or sixteen months. Commercial cars in use during the year 1921 will require for replacement about 116,250 batteries, worth $2,790,000 wholesale.

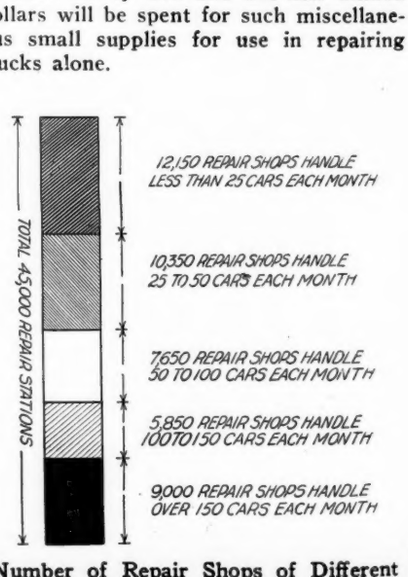
While the total requirements for replacement bearings on a single truck may be rather small during the course of a year, the fact remains that the total value of bearings required for replacement on more than 950,000 trucks attains a considerable size when totalled. Trucks in use during 1921 will require for replacement a total of approximately $9,000,000 worth of bearings of all types.

Severe operating conditions make it necessary to install piston rings more frequentiy on trucks than on passenger cars. In 1921 over $3,800,000 worth of piston rings will be sold for replacement. The value just given is based on wholesale and not on retail prices.

The replacement market for pistons is considerably larger than is the equipment market. This may seem a trifle strange to those who have been considering pistons as factory equipment only. Ford trucks in use this year will require for replacement about 780,000 pistons, worth $1,170,000, while other trucks in use will require 1,111,600 pistons, worth $1,945,000. The total value of pistons sold for replacement this year, therefore, will be in round figures $3,115,000.

Reckless driving, rough roads, and overloading are responsible for comparatively heavy replacement requirements of truck springs. In 1921, Ford trucks will need a total of about 390,000 springs, worth at wholesale $1,950,000, while other trucks wiill require 555,800 springs, worth $5,558,000. The total wholesale value of springs sold for replacement in the truck field this year will, therefore, be about $7,508,000.

The total quantity of miscellaneous small supplies required in repair shops over the entire country is seldom appreciated. The quantities of nuts, bolts, cap screws, lock washers, etc., used annually, run to surprising figures when totalled. In 1921 nearly five and one-half million dollars will be spent for such miscellaneous small supplies for use in repairing trucks alone.


TOTAL 45,000 REPAIR STATIONS
12,150 REPAIR SHOPS HANDLE LESS THAN 25 CARS EACH MONTH
10,350 REPAIR SHOPS HANDLE 25 TO 50 CARS EACH MONTH
7,650 REPAIR SHOPS HANDLE 50 TO 100 CARS EACH MONTH
5,850 REPAIR SHOPS HANDLE 100 TO 150 CARS EACH MONTH
9,000 REPAIR SHOPS HANDLE OVER 150 CARS EACH MONTH

Number of Repair Shops of Different Sizes in the United States

Some of the items cited above indicate the substantial character of the replacement market. As a matter of fact, the total wholesale value of parts sold for truck replacement, exclusive of the labor necessary to install these parts, will be approximately $55,000,000. This sum is equivalent to over 21 per cent of the value of all trucks which will be built this year. The possibilities in sales of service parts hardly needs further elaboration.

Selling Truck Service

All too frequently service is considered a necessary adjunct to the selling organization, but not necessarily a direct source of substantial profit. Service rendered on this basis in the past has been so poor as to bring the truck into disrepute in some sections. The figures quoted in this article indicate the substantial character of the repair business. Some dealers this year who have consistently built up the service department will find that service will be the backbone of the year's business. Many others who have not been quite so forehanded will do well to break even on service sales. A few of the old school, who persist in regarding service as something which is necessary, but undesirable, will operate at a loss. The dealer who shows a profit on his business this year will be the man who not only works for new truck sales, but who actively merchandises his service department. Over half of your service prospects, Mr. Dealer, do not fully realize that adequate, regular service is the best possible insurance that can be carried on their trucks. Sell them the idea that service is a vital necessity for successful truck operation, and be one of those progressive dealers who will share this year substantially in a business which will rival the business of the truck manufacturer so far as volume of sales is concerned.

Factory Service Managers Anxious to Co-operate

Buffalo Convention Exemplifies Greater Tendency to Help Dealers' Service Managers

CHANGING conditions in the motor truck and passenger car industry have undoubtedly had their effect in stimulating the service departments of many truck factories to a greater degree of helpfulness toward their dealers. At the Factory Service Managers' Convention, at Buffalo, under the auspices of the National Automobile Chamber of Commerce, May 16th to 18th, this desire to help the dealer service manager was continuously shown, both in the papers read and the discussions which followed. The factory men realize now more than ever that only by close co-operation with their respective dealers and service stations can they hope to accomplish the ultimate goal of every service department and that is a host of satisfied customers.

The affair was well attended and undoubtedly the men have been well repaid for the time that they gave to this convention. Incidentally, however, very little discussion arose in reference to motor truck servicing, although a great deal of the general discussion which took place could readily be applied to either passenger car or motor truck service.

Although an attempt was made to discuss the parts price situation, no definite conclusions were reached, due to the fact that this is not a question which could be settled by the service manager, but is rather a subject to be discussed by factory officials. The service managers, however, are of the opinion that a decrease in the parts price list would be beneficial at this time, and that if a more reasonable charge were made for parts in some cases, the tendency of the owner to use pirate parts would not be so prevalent.

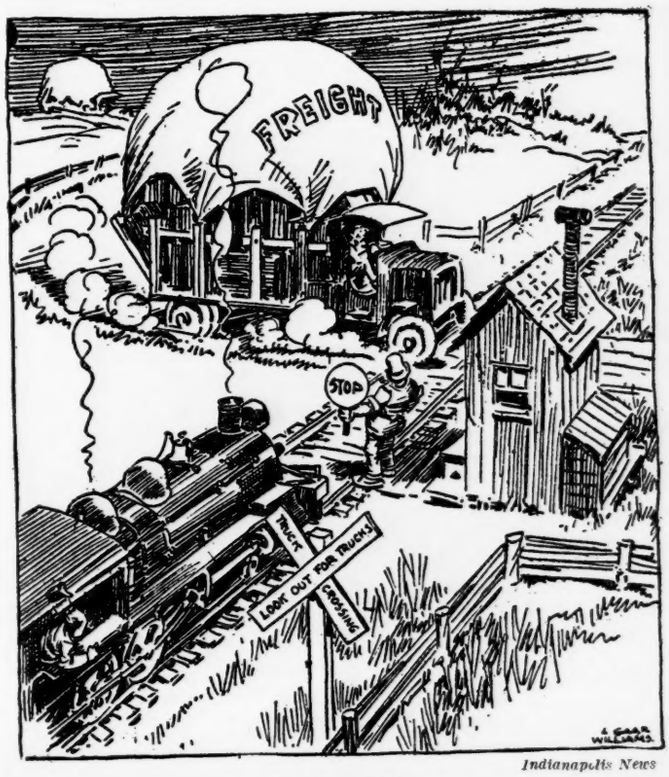
The engineering department came in for discussion as to its relation to the service department. Two papers were presented on this subject, the chief point made being that defective parts should be returned by the dealer to the factory promptly, so that the engineer can check up the defects carefully, and suggest remedies.

The tendency on the part of some dealers to return parts to the factory for credit, so as to shorten their inventory, was also discussed. Although there seemed to be no serious objection to the dealer doing this in most cases, it was suggested that a 10 per cent handling charge should be placed on all such material returned for credit, or such parts that might be termed "obsolete" on account of new designs replacing them should not be charged with this tax.

A number of papers were read on what service is and means, but no radical policies were formulated. The meeting resolved itself more or less into a real get-together convention, giving the factory service manager an opportunity to get better acquainted among themselves, which in itself is worth while, as it produces that spirit of frankness which eventually will result in a better exchange of ideas.

A dinner was tendered a visiting delegation at Niagara Falls at the conclusion of the first day's program, the trip being made in automobiles. This little outing was thoroughly enjoyed by all, and gave many of the service managers their first opportunity to visit one of Nature's wonders.

Col. Charles Clifton, president of the N. A. C. C., opened the convention with an address of welcome. H. R. Cobleigh, secretary of the Service Committee, read the report of the activities of the committee since the Cleveland convention. A. B. Cumner, of the Autocar Co., presided as chairman of the convention.



Indianapolis News

Pretty Soon!

Here's a Simple and Efficient

ACCOUNTING SYSTEM

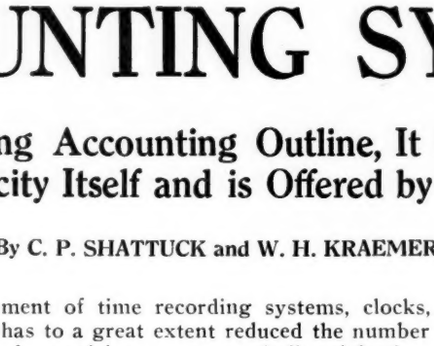
Scan the Accompanying Accounting Outline, It is Applicable to Your Business. It is Simplicity Itself and is Offered by an Accounting Expert

By C. P. SHATTUCK and W. H. KRAEMER

WITH the public expecting price reductions it is logical to reason that the cost to the owner of servicing his motor truck must be reduced; that is, the labor rate. During the war the price per hour of labor was gradually increased. Mechanics were in demand, and the factors of supply and demand contributed to the increased hourly wage paid the mechanic. The cost of materials, parts, etc., also increased, and the overhead was larger than previous to the war.

During the strenuous times service managers were hard put to obtain good mechanics. Experts were scarce and demanded high wages. As a result of these conditions much unskilled labor found its way into the service stations and floaters developed. Unskilled and semi-skilled labor shopped for work. But these conditions have changed and the majority of service stations are returning to a pre-war basis insofar as labor is concerned. In a number of cities visited, the writer was informed that good mechanics can be obtained, and at a wage comparing favorably with pre-war figures. In a number of cities some of the leading dealers stated that they were contemplating a wage reduction, varying from 5 to 15 per cent. These dealers stated that they disliked to reduce wages but it was imperative that service be placed on a business basis, that the customers were beginning to question the prevailing labor rate. Some dealers frankly admitted that their customers say that the war labor rate must come down, that with all other industries reducing wages the motor truck dealer must make a cut in the price of labor.

The labor is the greatest item in the cost of maintaining the motor truck. The cost of parts is small compared to that of installing them and it is always the labor that is questioned by the owner if he disputes the bill. While the development of time recording systems, clocks, has to a great extent reduced the number of complaints, errors and dissatisfaction, the average owner believes that the labor rate is too high. And there are many



No. 1. The Time Card Used With Calculagraph and Eliminating Disputes, Etc., as Well as Recording Idle Time of Mechanics.

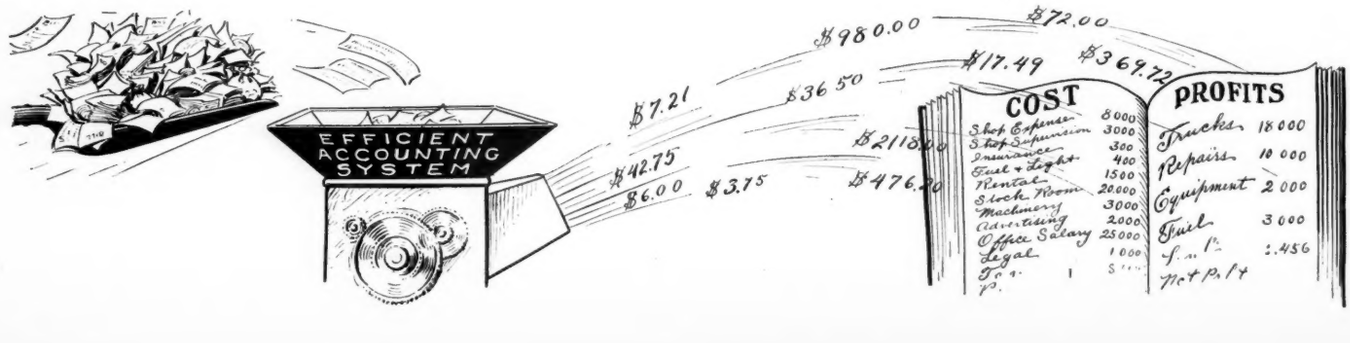
service stations and independent repair shops which cannot prove to their own, or to the customer's satisfaction, that the rate is not too high or that it is a reasonable charge for the simple reason these shops do NOT KNOW WHAT THEIR ACTUAL COSTS ARE.

Some dealers have informed the writer that if they reduce wages of the mechanics and other employes connected with the service station they will be able to reduce the labor rate in proportion to the cut in wages. If the cut be 15 per cent in wages, and using the average rate of $1.50 the hour as a basis, the new rate would be $1.27½ cents the hour. For certain pyschological reasons the rate would have to be made either $1.30 or $1.25, and if the latter there would be a matter of 2½ cents the hour less than was being previously charged.

Can the service station stand the loss of the additional 2½ cents? In the course of six months or a year this small matter of a few cents the hour may amount to a considerable sum where a number of mechanics and other employes are concerned. How is the dealer to know? He must employ some form of accounting system which will enable him to ascertain daily, weekly or monthly the profits or losses on each job performed. A cost system is imperative to the service station and the repair shop, for the dealer must know what it is costing him to properly service the trucks he has sold.

There are too many dealers who fail to take a business interest in their service department. It is considered by many as a necessary burden and too little attention is given it. Some say they operate service at a decided loss. Others are happy if they break even at the end of the year on service. A few admit making a slight profit. And a very small number make a real profit. Arguments pro and con are advanced why service should not be profitable, why it should be a matter of an even break. Some are content to allow the profits on parts to carry the overhead of the repair department. Others will not credit the service station with the profits on parts, keeping the stock room as a separate department, and placing what the writer believes a heavy burden on the labor department. The best operated service stations, those making a profit, do not separate the stock room so carefully but credit its profits to service.

An investigation of a number of service stations held to be operated at a loss by the dealer were found to really be making a profit but not credited with it because a large number of items, labor and expense which should be charged to the sales department, were being carried by the service department. Too many dealers of this type when asked why say: "What's the difference in dollars and cents? If we take it out of the sales and credit service or vice versa it all amounts to the same when we count up our money



COST JOURNAL

SHEET NO.

RECORD OF COSTS FOR THE MONTH ENDING 191

REPAIR COST | TRUCK COST | GUARANTEE MAINT. | DEMONS. MAINT. | DEMONS. EXP. | HAULING EXP. | GARAGE EXP. | SHOP EXP. | NON-PROD. LABOR | MACHINERY AND TOOL MAIN. | GARAGE LABOR | SALESMANS CAR EXP. | STOCK ROOM EXP. | MISCL. ACCTS. | JOB OR ITEM NO. | MISCEL. ACCOUNTS | GARAGE SUPPLIES | MATERIAL | LABOR | BURDEN RATE | BURDEN

No. 4. The Cost Journal Sheet and Affording the Burden Rate the Key to the Cost System

at the end of the year." It does and it doesn't. It does not if the dealer is broad minded and has the interests of his customers at heart, and is striving to give high class service at a price that is reasonable. If the dealer is charging say $1.50 the hour labor because his overhead requires such a charge, and the overhead is swelled because the service department is carrying burdens of the sales department, the dealer is not giving the customer a square deal. If expenses were charged as they should be it is probably that the rate per hour could be reduced and the shop make a profit. At least the dealer would have concrete knowledge of his service station which too many dealers have not. Too many are concentrating on sales and forgetting the service end. In times of depression, in the buyer's market, the dealer of the future will consider the service station the bridge which will tide him over strenuous times, not forgetting the fact that customers satisfied through service sell trucks for the dealer.

By W. H. KRAEMER

The great fault with the average service station or repair shop is that their bookkeeping systems do not reveal the true condition of the business, or that they fail to furnish certain necessary information. The principal object is to obtain some set of figures with as little time and accounting knowledge as possible. It requires a certain number of parts, mechanical operations and time to build a good motor truck. It is impossible to discard any part of the assembly and still have a good truck left. It is so with an accounting or cost keeping system.

The system described herein is believed to be efficient and in addition to being practical for one service station or main branch can be employed with one or more branches. With two branches the accounting can be done at the main office by four people. Of course, the branch managers supply daily reports and certain assistance is rendered by the service managers and stock room clerks of the branches, who do the pricing, costing of parts, etc.

The methods of testing, making out reports, etc., need not be discussed. They are developments of the service and not of the accounting department. As soon as the necessary work on a truck is determined, men are assigned by the foreman or superintendent, and immediately punch in their time on a job card (illustration No. 1) and punch out when finished or when quitting, for lunch, for example. All time is recorded on a Calculagraph which automatically computes the elapsed time. This clock saves the cost of one clerk. Parts are issued on written order in duplicate by the superintendent or foreman. These orders or store requisitions (illustration No. 2) are numbered. All issued in a day are checked according to number each morning by the job clerk. Should one be lost, there is the stock room copy from which to make the charge on the job. There is no

Upper Right: No. 5. Stock Clerk's Requisition on Purchasing Department. Lower Left: No. 7. Tester's Report, Also Used by Road Inspector in New Truck Inspection.

PURCHASE REQUISITION No. 9633

TO MR. PURCHASING AGENT

DATE 192 DATE WANTED 192

WEIGHT | NO PIECES | ARTICLES | PART NO

SIGNED STOREKEEPER

TRUCK INSPECTION REPORT No. 500

DATE 19

OWNER CONDITION OF TON TRUCK No.

ADDRESS CUSTOMER'S COMPLAINT

Radiator	Front Axle
Motor	
	Rear Axle
Governor	Radius Rod
Carburetor	Torque Arm
Ignition	Brakes
Circulation	Control
Lubrication	Frame
Fuel System	Springs
Steering Gear	Wheels-Tires
Clutch	Hood
	Fenders
Transmission	Lamps
	Horn
	Muffler
Propellor Shaft	Body
Jack Shaft	
Chains Sprockets	Hoist
	Battery
Inspector	Mileage
Customer's Signature	Loading

STORES REQUISITION A 3551

Job No. Truck No. Date 192

Owner Employee No.

BIN NO. | No. | ARTICLES | PART NO. | PRICE PER UNIT | TOTAL | COST

ENTERED ON STOCK RECORD BY | POSTED ON JOB SHEET BY | PRICED BY | SOLD BY

Lower Right: No. 2. The Stores Requisition and in Duplicate, One Going to Office for Checking and Avoiding Loss of Parts or Not-Charged-in Work

doubt that under the old method of issuing only an original order, many parts were installed and slips lost. All time cards and stores requisitions are delivered to the office each morning. The job clerk inserts employe's rate and computes cost on the time card. Both are then filed in the proper envelope (illustration No. 3).

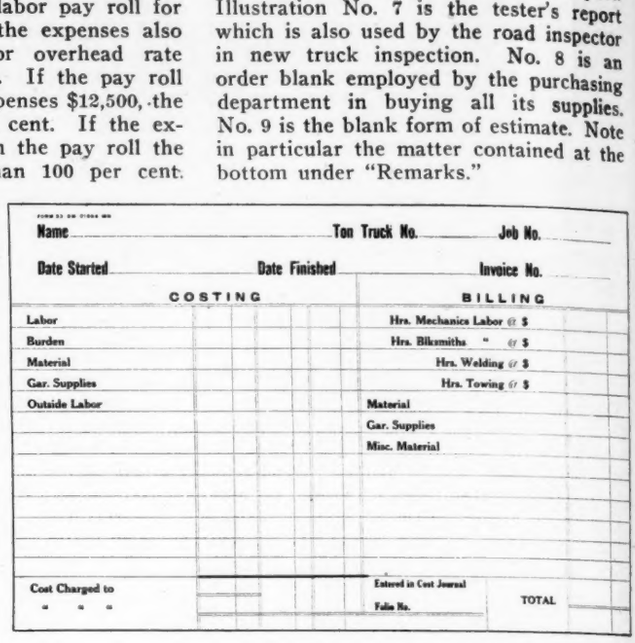
When the job is finished, the total time is computed on an adding machine. Invoice is typewritten, all material being listed on invoice direct from the stores requisition. This is superior to the old method of posting all time and material on a job sheet from the time cards and requisitions, which is duplication of work and taking the time of one clerk.

Attention is directed to the job envelope (illustration No. 3). The billing price is computed on the right side and the cost price on the left. The three columns on the cost side are used when jobs run over the end of the month or even two months. The cost of labor and material at the end of a month are computed on the first column, the total of which is the Work In Process figure for the monthly Profit and Loss Statement.

Use of the Calculagraph, previously referred to, reduces to a minimum, errors, complaints and dissatisfied customers. When men punch out on a finished job and are not immediately assigned to another, the lost time shows up by comparison of their time cards with the regular daily clock card. Knowing this, the superintendent or foreman will be on the alert to prevent lost time. Supervision under this plan becomes more efficient and cost to customer considerably reduced.

The finished job is entered in the Cost Journal (illustration No. 4) after completing both billing and costing prices. The burden rate is really the key to the cost system. Unless this rate is accurate, costs mean nothing. Briefly, it is obtained in this manner. Divide the amount of productive labor cost for any given period into the service department expenses for the same period. For example: If the productive labor pay roll for 1920 was $10,000 and the expenses also $10,000, the burden or overhead rate would be 100 per cent. If the pay roll was $10,000 and the expenses $12,500, the rate would be 125 per cent. If the expenses were lower than the pay roll the rate would be less than 100 per cent. Rates in New York City, for example, are well over 100 per cent as a rule. Supposing the rate was correctly determined to be 125 per cent. If the labor cost on a job was $12 the burden or overhead on that job would be $15. To this add the cost of all material or outside labor, such as welding or radiator repairs, and you would have the true cost of that job. A comparison with the amount charged the customer is, of course, the net profit.

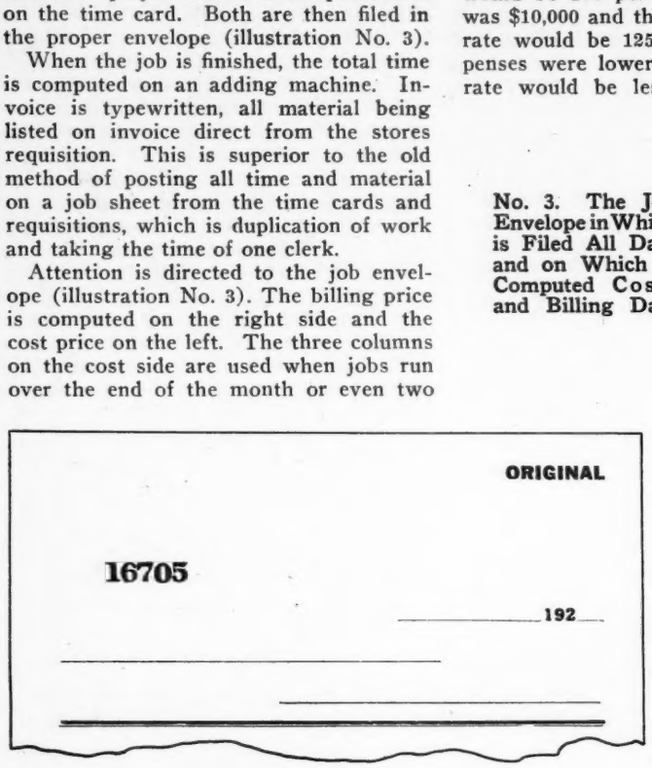
Illustration No. 5 is the stock clerk requisition on the purchasing department for all supplies and stores. Illustration No. 6 is a job card, used by the foreman in itemizing the work to be done on a truck after the tester has made his report. Illustration No. 7 is the tester's report which is also used by the road inspector in new truck inspection. No. 8 is an order blank employed by the purchasing department in buying all its supplies. No. 9 is the blank form of estimate. Note in particular the matter contained at the bottom under "Remarks."


Name _____ Ton Truck No. _____ Job No. _____

Date Started _____ Date Finished _____ Invoice No. _____

COSTING		BILLING	
Labor		Hrs. Mechanics Labor @ $	
Burden		Hrs. Blksmiths " @ $	
Material		Hrs. Welding @ $	
Gar. Supplies		Hrs. Towing @ $	
Outside Labor		Material	
		Gar. Supplies	
		Misc. Material	
Cost Charged to		Entered in Cost Journal	
" " "		Folio No.	TOTAL

No. 3. The Job Envelope in Which is Filed All Data and on Which is Computed Costs and Billing Data


ORIGINAL

16705

_____ 192__

_____

_____

In Filling this Order note the following Instructions

1. Put the number of this order on your bill and send bill with bill of lading to us as soon as goods are shipped.
2. If prices are not specified they are understood to be no higher than last bill or price quoted to us.
3. Refer to above number in all correspondence.
4. Please acknowledge receipt of this order and state when you will ship.

Very respectfully,

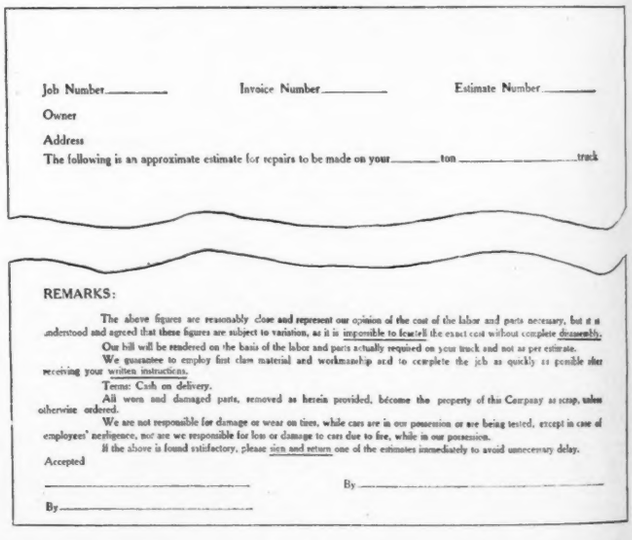
Per _____

No. 8. Order Blank Employed by Purchasing Department in Buying All Supplies and Stores

Illustration No. 10 is the perpetual inventory card. A yellow copy is kept in the stock room bin and parts received or withdrawn are properly recorded. A duplicate record, made from creditors' invoices after supplies have been received, from cash sales duplicates and from stores requisitions received each morning, is kept in the accounting department. A comparison of these two sets at any time shows up any discrepancies in the stock department. The effect of this duplicate office set is psychological. Their knowledge of this complete and accurate check tends for accuracy, honesty and promptness on the part of the stock room employes who are bonded.

Invoices for parts sales and shop sales are credited to "Repair Sales." The cost of the parts and the cost of shop sales, or jobs, are charged to "Repair Cost," the difference being either actual net profit or actual net loss.

With large organizations the Repair Jobs can be subdivided into a separate


Job Number _____ Invoice Number _____ Estimate Number _____

Owner

Address

The following is an approximate estimate for repairs to be made on your _____ ton _____ truck

REMARKS:

The above figures are reasonably close and represent our opinion of the cost of the labor and parts necessary, but it is understood and agreed that these figures are subject to variation, as it is impossible to foretell the exact cost without complete disassembly.

Our bill will be rendered on the basis of the labor and parts actually required on your truck and not as per estimate.

We guarantee to employ first class material and workmanship and to complete the job as quickly as possible after receiving your written instructions.

Terms: Cash on delivery.

All worn and damaged parts, removed as herein provided, become the property of this Company as scrap, unless otherwise ordered.

We are not responsible for damage or wear on tires, while cars are in our possession or are being tested, except in case of employees' negligence, nor are we responsible for loss or damage to cars due to fire, while in our possession.

If the above is found satisfactory, please sign and return one of the estimates immediately to avoid unnecessary delay.

Accepted

_____ By _____

By _____

No. 9. The Blank Form for Estimates. Note Remarks at Bottom

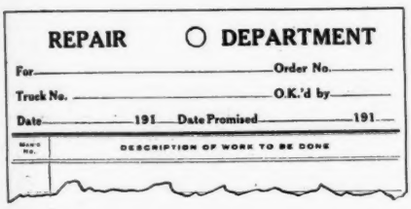
sales account and the stock room or Part Sales into another to determine actual shop conditions. This subdivision is not necessary until the dealer has built up a large organization. Also in large organizations the entire accounting system becomes more complicated, with the attending added detail. The primary principle remains the same however.

The overhead or burden rate distribution may involve a number of factors and may include the following:

Shop Expense—Under this head is charged small items such as cost of cleaning floors, brooms, brushes, etc.

Shop Supervision—Salaries of service manager or foreman. But if either do actual work, such as adjusting or repairing a component or component part, work charged to customer or sales department, such labor is productive and so charged.

Miscellaneous—This is shop expense and for items not charged against other heads. For example: The factory service manager calls and is taken out to lunch by foreman or service manager, the expense is charged to miscellaneous account. Also cost of towels, soap and material used in shop lavatories, etc.


REPAIR ○ DEPARTMENT

For _____ Order No. _____

Truck No. _____ O.K.'d by _____

Date _____ 191 Date Promised _____ 191

DESCRIPTION OF WORK TO BE DONE

No. 6. Job Card, Used by Foreman for Itemizing Work to be Done

Insurance—Premiums on bonded men such as in parts or stock room, workmen's compensation, tester, parts, etc. If service station is a department of a dealer's business the insurance of building should be pro rated; that is, the service station charged on the basis of number of square feet floor space. If service of mechanic for driving is required by sales department, the cost of his bond, etc., is pro rated with sales department.

Fuel and Light—Cost of coal, electricity and gas. If service station is a department charges should be pro rated as with insurance. Also any repairs or alterations to heating and lighting equipment which do not add to assets.

Rental—Charged as a whole or pro rated on sq. ft. basis if service station is a department of dealer.

Stock Room—Salaries, wrapping paper, twine, forms, stationery, stencils and brushes, packing cases and shipping material, etc. All repairs or alterations which are not an asset. For example: If the bins are changed, or relocated, this is a labor charge and not an asset. If new bins are constructed there is a charge for labor and material against the department, but the wooden members cannot be credited as an asset. If additional metal bins are installed the cost of work is charged and the equipment is an asset.

Machinery and Tool Maintenance—Cost of maintaining machinery and tools. For example: Grinding reamers, etc., repairing a lathe or drill press. Also should a $5 reamer be broken the cost of replacing is charged in this account. The keeping of costs is important for it enables the accountant or bookkeeper to advise service head of the number and cost of broken reamers, taps, drills, etc., and analyze the reasons for same.

Advertising—Advertising for mechanics, foreman, service manager, or for labor of the shop or stock room. Also advertising for new work.

Repairs and Alterations—The changing the location of machinery or equipment, departments of shop, etc., and where there is no profit to be derived from the labor, or actual value that can be credited as an asset.

Office Salaries—Salary of bookkeeper, stenographer, clerks, etc. If strictly a service station these to be charged as a whole, but if a sales department be included the costs pro rated. This will have to be determined by the dealer, although some divide the costs between the sales and service department.

Guarantee Maintenance—If only a service station from five to ten per cent is charged to this account to care for the expense of "come back" work. The exact per cent can be determined after system is in operation. This account is valuable in that it checks against faulty work. If a car or truck is serviced and with maker's warranty the labor, etc., should be charged to the sales department.

Freight and Express—Charges or transportation cost on parts, etc., received and those shipped prepaid. If for replacement under warranty, charges should be made against sales department.

Legal—Cost of collecting bills. While it may be that the cash system is employed there may occur charge accounts requiring the service of a lawyer.

Postage—Stamps for mailing bills, letters, etc. Where there is a sales department the usual method is to divide the expense as the cost of keeping accounts itemized would be more than amounts involved.

Printing and Stationery—Letter heads, envelopes, bill heads, forms, etc. These are pro-rated, the shop forms being charged to shop which bears its proportionate share of stationery. If a service station only it will be charged the entire cost of stationery and forms, etc.

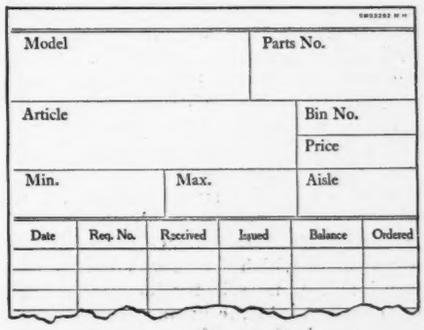
Taxes—Under this head may be real estate, Federal income, State income, water, State capital stock, capital stock franchise, city and miscellaneous. With a sales department or others the taxes should be pro rated on the square foot floor space basis, or on a plan which takes into account also the total investment in each department.

Telephone and Telegraph—Inasmuch as the service department will wire for parts, etc., and telephone locally and otherwise, it is deemed fair and equitable to divide the expense with the sales department, if there is one.

Interest on Mortgage—On land or building. Should be pro rated if a sales and other departments are included.

Free Service—While this was not discussed by the accountant with the writer the latter believes that any free service (which relates only when truck is sold) should be charged at least at cost to the sales department. The free service may include inspection, minor adjustments, lubrication, etc., which in the course of a year amounts to a considerable item in the expenses. If an account be devoted to this subject it will enable the truck dealer to actually know what it is costing him for free service and to measure the value of it against the expense. Free service is a form of non-productive labor for the service station of the dealer and if he be too generous it will affect the showing of his station, which should be earning money notwithstanding the statements of some dealers that service should not earn a profit.

Service Car—The cost and expense of operating the service car should be pro rated between the sales and service station. The sales benefits by the service rendered by the car and should share its proportion of cost and upkeep. The service car is an asset, as generally it or the chassis can be sold without any great loss.


Model		Parts No.			
Article				Bin No.	
				Price	
Min.		Max.		Aisle	
Date	Req. No.	Received	Issued	Balance	Ordered

No. 10. Perpetual Inventory Card. Same on Back. A Yellow Copy is Kept in Stock Room Bin and Parts Received or Withdrawn Are Recorded.

Power—Covers electricity purchased from power company for power purposes, if on a separate meter, etc. If water be used for elevator it will be charged under water taxes. If electricity, under fuel and light item, or according to meter arrangement.

Depreciation—Should be based upon the inventory of the machinery and equipment, office furniture, fixtures, etc., but not on building, as this is covered under rental. A suggested depreciation is 10 per cent annually.

What Does the Manufacturer Owe the DEALER?

Is the Dealer Responsible for Service in His Territory? What Can the Manufacturer Do to Enforce Service Policies?

Are You Giving YOUR Dealers a Proper Start?

By ALBERT G. METZ

A CAREFUL analysis of the service problem raises the question as to whether service should be rendered according to the dealer's way of thinking or should the dealer be forced to adhere strictly to the policies, rules and regulation, etc., prescribed by the manufacturer?

The answer to this question depends entirely upon the results which the manufacturer expects to obtain.

To begin with, sight must not be lost of the fact that the dealer is the medium through which the customer expects to receive service, provided of course that the dealer is the one through whom the truck was purchased. We might as well make ourselves clear, that the discussion which follows is based on the prevailing method of selling motor trucks and that is through dealers and distributors.

LET the manufacturer look this service problem squarely in the face. Who is at fault when the dealer does not give the kind of service which the owner expects? Is it the shop foreman, the stockroom clerk or the head of the dealer establishment?

Who is at fault if the owner is held up days and even weeks for some part that should be in the dealer's stockroom?

Who is at fault if the dealer does not carry a suitable stock of parts?

The usual answer is—the dealer.

Let us see if this answer is correct. Let us retrospect upon the conditions which surrounded the establishment of some of these dealers which are now criticised for their inability to sell trucks. How did they ever get into the business?

Why aren't they selling motor trucks? Why aren't they giving service? Why are some manufacturers trying to sell motor trucks by this or that plan—just to get rid of them?

Why are some of the independent repair shops getting the repair work?

Again we say, is it the dealer's fault that these conditions exist?

Suppose we review the circumstances under which many dealers happened to land in the motor truck business in the past few years.

Here's a typical case: We shall name him Mr. Brown (the factory man who reads this will perhaps recall a few names that can be substituted). Brown runs a garage in Slowville, New York State. One day a contractor friend happens along who needs a motor truck. He asks the advice of Mr. Brown regarding the purchase of a truck. Brown gets busy and makes some inquiries, and before many days have come to pass a factory representative of a new truck company places a truck in front of Brown's establishment. Mr. Brown also gives out the welcome news to the factory representative that he can sell a few more trucks in his vicinity. Of course, Brown wants to make sure of his commission. He got it to be sure, and friend contractor gets a rake-off also. Another truck on its road to glory?

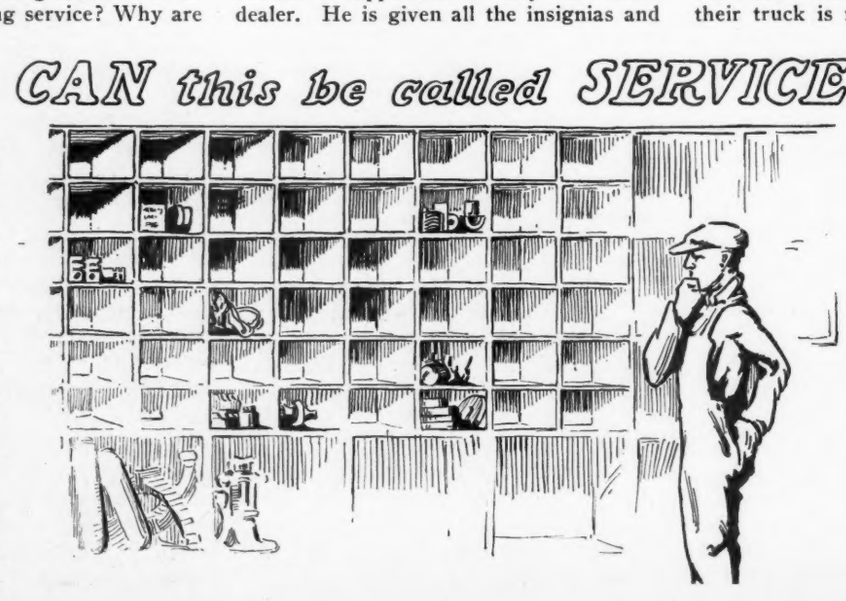
The factory goes a step further. Mr. Brown is appointed a duly accredited dealer. He is given all the insignias and literature that gives him the authority to sell motor trucks in Slowville. The sign over the door states that he runs the authorized service station for the So-and-So Truck Company.

But—this is where the history of the particular individual's activity as a truck merchant terminates.

Perchance he may sell a few trucks in the future out of sheer luck. He isn't pushing the sale of trucks in his alloted territory. About the only function he performs is to give the manufacturer an opportunity to state in his advertising that he has representatives in all sections of the country.

This method of securing motor truck dealers is not a new one. It has been practiced by many manufacturers whose main idea was to advise the public that their truck is represented in every hamlet in the country. They have not attempted to build up their selling organizations gradually with the proper type of dealer but attempt to cover the whole country with dealers in the period of a year or so. Any garage, any third rate machine shop, in fact, any individual who appears to have enough money in bank to make a part payment on a truck chassis or two is given the agency.

We do not wonder therefore that the comment of the factory sales manager



runs somehting like this: "I wonder what ails that bird in Slowville. He's got a good-sized territory but Brown isn't selling anything at all. We certainly got to get rid of that party. Say if he'd only sell a few trucks it wouldn't be so bad, but that fellow's asleep. We've got to get someone else in his place."

Why Some Territories Are Failures

And forthwith the process of canning said dealer is put into operation. Another dealer takes his place. He may be an improvement on the first one, but we doubt it, the reason for this being that the second party was perhaps lined up similarly to the first dealer. And it is not uncommon to have this process kept up for some time in that territory. In fact, the factory is continuously changing dealers. In the meantime this territory is closed to all further development.

Can Brown be criticised for his actions? Hasn't the agency been forced upon him? Has the manufacturer any right to sell under such circumstances?

Absolutely not. It is simply another one of those deplorable conditions which exist to some extent in an industry which has made extraordinary strides in a short period of time. With this quick growth have also developed evils which must be eradicated before the complete confidence in this industry can be restored.

Is it any wonder that **some** manufacturers have not been able to gather around them a thoroughly efficient high-class dealer organization?

Is it any wonder that the mortality and turnover in truck dealers throughout the country has been so great?

Is it any wonder that PRICES ARE CUT BY THE DEALER?

Is it any wonder that some manufacturers are resorting to any subterfuge to sell their product after failing to establish a high class representative dealer organization?

The question arises what is the industry going to do about it?

It is the consensus of opinion that the motor truck industry has been through the worst of the general depression and that as general business gets under way the motor truck business will go with it. How it will keep step with other industries depends entirely upon the business policies SOME manufacturers are going to establish.

We lay particular emphasis upon the word some.

Sacrifice Merchandizing Methods and Lose

The manufacturers who are facing the future with confidence are not running around in circles these days wondering how soon the receiver will be appointed. Unfortunately, however, many are on the other side of the fence. They are at their wits ends, and in their attempt to keep their plants from going into the receiver's hands, are throwing into the discard merchandising methods which have proven the MAKING OF THE SUCCESSFUL motor truck manufacturers of today. They are instead resorting to any method which will produce immediate results, and in the interim no attempt is made to give service to the trucks sold under such circumstances.

The most influential and the most prominent motor truck companies that are today enjoying a fair business are the ones who have given the service problem foremost consideration. They have realized without doubt that the repeat orders, which are so highly prized by the reputable manufacturer in any line of business can only be obtained by treating the customer right, which means selling him a truck that will prove an investment and on which service can be delivered—not promised.

That many manufacturers are fully aware of the changing conditions confronting the motor truck industry is recognizable by the very fact that the **most substantial manufacturers are admitting it.**

Weed Out All Undesirables

Within the past half year many dealership franchises have been cancelled. And many are still due for cancellation. Territories have been revised, and new contracts have been drawn up. These manufacturers have been house cleaning so to speak. They are now satisfied to take their time in alloting a new territory. They are not trying to bull the market. They are satisfied to build up a substantial market for their product by the only sure way and that is by surrounding themselves with a high class organization that is capable of financing itself adequately and which is putting a satisfied customer and proper service facilities ahead of intensive production and rotten selling methods. The manufacturer who realizes these conditions cannot help but succeed.

On the other hand however, we have the manufacturer who has entered the market with the pre-conceived notion that the motor truck business was about the easiest one in the world in which to make money fast. All you had to do was to go out and appoint any Dick, Tom and Harry as a dealer and the rest would take care of itself. Or appoint a few big distributors and load them up to the neck. They would appoint so many dealers, also in the same unethical business manner and the production would be taken care of easily.

Wonderful theory but poor practice.

During the hey-dey days of the past some of these manufacturers have gotten away with it. But, as we said before—times have changed. The manufacturer who has not recognized the handwriting on the wall and who believes that the service end can be treated with intolerance in the future had better quit the business and give way to the man who has a keener conception of the industry's future. There is nothing prophetic in this—the fact remains that those companies which have made service the vital issue of their business are the ones which today are in a position to continue without further difficulties.

What the industry needs is a keener conception of the future possibilities of the motor truck in the scheme of transportation. The manufacturer must give serious thought as to how his product can be of service to the consumer rather **than how many trucks he can sell in a year.** Too much consideration has been given to the profits to be made by the sale of so many truck chassis and not enough on how many of those chassis will be sold where they do the most good.

An Old Point That's Always New

Not enough thought has been given to the fact that the ultimate consumer is the one who pays the bill. If he is satisfied with his purchase and his truck is an investment that is earning him a profit, **he becomes a booster.** The industry **needs more of such boosters.** All the more need for selling trucks right. And the only way motor trucks can be sold right is for the manufacturer to insist that they be sold right, and that the service is rendered according to well developed plans.

The manufacturer must insist that the dealer carry the stock of parts which he knows from experience to be necessary for the proper servicing of his product—right from the start and not six months or a year later—perhaps never.

He must insist upon a careful periodical check-up of each and every truck in his territories by the dealer or distributor if he expects to know what his trucks are doing, how they are performing and what the prospects are for future sales.

He must realize that if a certain territory is too large for the dealer to handle it properly, it will benefit the dealer, himself and the industry at large if he will cut down that dealer's territory, and let someone else handle it. The dealer will do far better cultivating a smaller territory intensively than trying to handle a big territory with insufficient salesmen or not enough capital.

There is no panacea for the service problem.

Each manufacturer must carefully analyze these conditions for himself. Plans which one manufacturer can readily adopt may be too expensive for the other.

However, there is one thing we cannot impress too strongly on the truck manufacturer and that is he must give service foremost consideration in any plans that he should undertake. There must be more co-operation between the factory service department and sales department.

There isn't a piece of machinery in existence that can function continuously without occasionally needing some repairs or replacements.

What Value Do You Attach to Inspections?

How can the truck manufacturer expect to get by without periodical inspection and occasional replacement of new parts when it is one of the most abused of modern transportation vehicles?

The service on motor trucks resolves itself into one vital condition and that is simply the furnishing of parts. One wrist pin in the dealer's stock room is worth ten in the factory bin.

It all depends upon the start which the manufacturer gives the dealer—start him right and he will be a success.

Manufacturers have appointed dealers indiscriminately, paying absolutely no attention to the financial standing of said dealers. The prime object of these makers has been to make sales. Service is looked upon as a necessary evil and between service and no service they chose the least.

Too many dealers have been appointed under the assumption that the carrying of an adequate stock of parts is unnecessary during the beginning of his career. Time enough after he had disposed of a few trucks. Usually that time did not arrive.

However, the manufacturer who has insisted upon the dealer carrying the recommended stock of parts and who consistently encouraged his dealers to keep their stock at a certain figure at all time has little to worry about the future of his dealer organization. Certainly some dealer franchises in any organization are bound to change hands, but these changes will be in the minority.

The more seriously the service problem is considered the more conclusive the result is apparent, namely, that no motor truck can be sold in the future unless the buyer is assured of continuous and satisfactory use of that vehicle.

Does Your Service Station Need the Pulmotor?

Read This

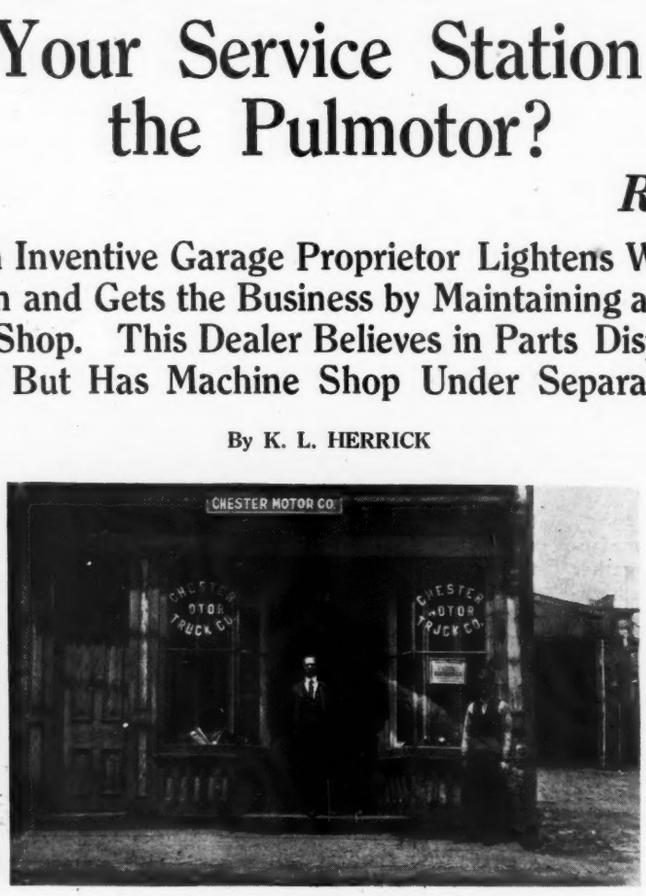
How an Inventive Garage Proprietor Lightens Work for His Men and Gets the Business by Maintaining a Worth-While Shop. This Dealer Believes in Parts Display for Trucks, But Has Machine Shop Under Separate Roof

By K. L. HERRICK

ASK anyone in Chester, Pa., which service and repair station gets the most heavy truck business, and there will be but one answer — "the Chester Motor Truck Co." While the trading name of the concern, at 14 W. Second Street, conducted by Samuel P. Shron, sounds like a hauling contractor's, in reality the business is that of an independent servicing company, specializing on trucks, of which it handles in its shop an average of one hundred and fifty in a year.

The building is ninety by one hundred and fifty feet, so, taking out the space, forty-four feet square, occupied by the machine shop, there is ample room for servicing two or three trucks, at least, at one time, and storing a large number in the portion devoted to garage purposes.

Shron also cashes in on the sale of solid tires, handling United States solids only, in sizes from 32 x 3, to 40 x 14. As Chester, a city of some 60,000 population, has much heavy truck hauling because of the shipyards, locomotive works and kindred industries, the field is a good one.



The Chester Motor Truck Co.
Although not so prepossessing in appearance, business is carried on an extensive scale. Service is the factor that gave this independent service station its "Rep"

How the Chester Motor Truck Co. Avoids Lifting in Operating Big Tire Press Sunk in Flooring

Shron has five mechanics at work now, but in seasons less slack he has a force of eight. All are experts and require little or no supervision, which leaves Shron free to get business when he is not engaged in actual shop work. Having been a practical truck builder is of decided advantage to him in both diagnosing truck troubles and in repairing.

There is considerable difficulty now in obtaining certain parts for trucks that were made four or five years ago, and yet which are by no means "orphans," says Shron. For instance, he pointed to a vehicle which had been stalled in his shop for a week, because of inability to obtain the proper housing for an axle that used to be made in three pieces, whereas now the housing is of one piece. There is of course, less trouble in obtaining standard parts for trucks of new, or comparatively new manufacture.

Shron is well qualified to do the heavy-truck work and he is well supplied with machinery. His equipment includes an 18-inch lathe, a 24-inch and an 18-inch drill press, a small speed drill, portable electric drills, an elec-

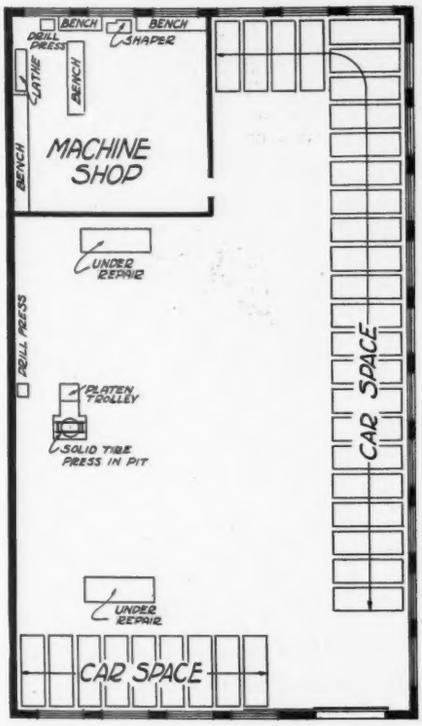
tric grinder, a shaper, a planer, a blacksmith shop with full outfit, an air compressor and a 7½ horsepower electric motor, acetylene welding equipment and burners, a floor crane and a 300-ton solid tire press.

The arrangement of the big tire press is remarkable, Shron having devised a plan to do away with that bugbear of the tire press room—heavy lifting. He originated the following scheme:

He had a pit dug in the floor to let the base of the press down to a depth of five feet, this bringing the main plunger platen flush with the floor. Close beside the press he had a shallow, oblong pit dug to admit, also flush with the floor, a steel trolley on wheels, bearing the other platen, of 40 inches diameter. The operator, after placing the rim and tire on the platen that is on the trolley, merely has to start the trolley-slab rolling with a crowbar. The trolley slips its burden under the plunger and there is no lifting whatever. After a tire has been pressed on, the trolley and platen are run back into the original position.

The press has two outside one-inch pumps and the third is a ⅝-inch. The press is sufficiently powerful to press one tire off and one on at the same time.

The Palace Garage, conducted by the Palace Automotive Sales Company, 922 Morton Avenue, Chester, Pa., William M. Powel, proprietor, is the city's Reo truck and passenger car service station. While other vehicles are given service, the specialized effort of repair is extended to Reo speed wagons.



Convenient Shop Layout of the Chester Motor Truck Co.

Upwards of 150 Reos are sold from here in the course of a year and the house does a good storage business. A stock of parts valued at $5,000 is kept on hand and, as Powel believes in having truck parts and accessories on display, notable among the goods first seen on entering the office are orderly "open-face" bins for truck bolts and other small parts; horns, lamps, whistles and the like. Truck springs are grouped so as to be seen through the window and there are attractive display cases containing accessories.

From ten to a dozen mechanics are constantly working in the garage and in the machine shop, which latter is under a separate roof. Powel believes there is an advantage in housing repairs separately, as the men can work uninterruptedly. Two colored men are employed on an all-night shift in the garage to put on and off tires, and supply customers with gasoline, air, oil and grease. The machine shop outfit includes a lathe, bench tools, drill and arbor presses, air compressor and forge; acetylene welding equipment and apparatus for minor adjustments.

Harvest for Independent Service Shop

Proprietor With Proper Facilities Can Obtain Much Business in Certain Portions of the Country Where Dealers, Because of Unwilling Mechanics and Poor Equipment, Turn Down the Work

This Repair Shop Has 340 Regular Clients

By K. H. LANSING

THIS is certain: There are parts of the country where dealers, yielding to the strong disinclination of their mechanics for the hard and hand-soiling work attendant upon servicing heavy trucks, have let this type of work slip, or done as little of it for customers as possible and thereby created an unusual opportunity for the hard-headed, determined, practical proprietor of an independent truck repair station.

If the proprietor can succeed in finding the right type of workmen, unspoiled by war wages and short shifts, in some localities there is a harvest for him and he won't even have to do much soliciting of trade. It is surprising how many dealers a canvass of the outskirts of Philadelphia and in small surrounding towns revealed who declare they don't want to service trucks and could not do it if they would, "because our mechanics won't do the hard work."

Typical answers to queries among dealers and, in a few cases, independent serv-

Brinser Finds His Service Car of Benefit to His Customers and Himself. It is a Rebuilt Ford With a Special Body

ice stations, regarding the repairing of trucks, were:

"We wish them on the other fellow," and "we send 'em up the road to Jack's; that work's too hard," or "our men won't do that heavy stuff unless there's nothing else to be had." This refers, of course, sorts of "transients." He has a flat rate for Packards and Macks and is a firm believer in the flat rate's final triumph, although the makes mentioned are the only ones at present that are handled under this system.

Here is his flat rate plan which he makes out for his customers having Packards or Macks, as soon as they drive in, obtaining their signature thereto:

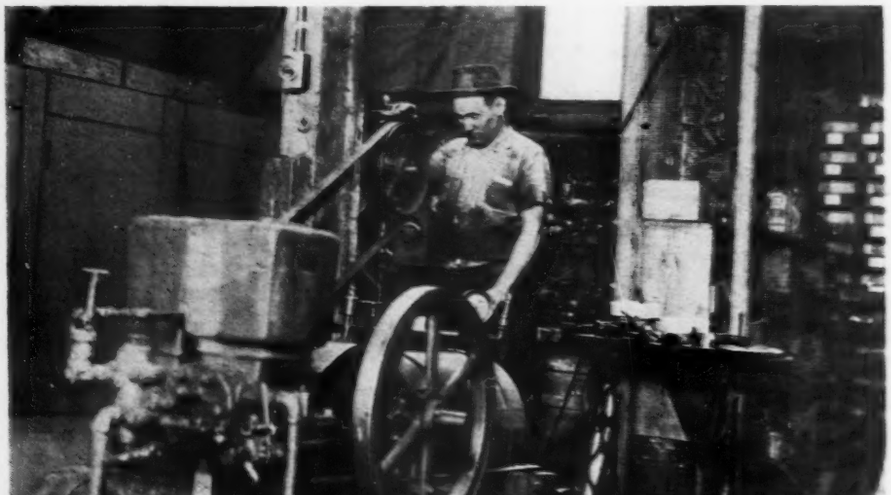
Burning out carbon	$2.00
Grinding valves	7.50
Relining foot brakes	5.40
Relining hand brakes	11.50
Adjusting bearings	27.00

Anything else is extra. He has tried servicing fleets of trucks on contract, but does not do business that way now, as experience, he said, showed that unless the drivers were expert, it necessitated doing much work for the money.

As to Brinser's facilities: Brinser's Garage, as he calls his independent service station, is sixty feet by eighty-five, with front and rear entrances. He is in a heavy mill traffic center and there are big industries of various kinds all about, the trucks rumbling for the most part over heavy cobblestones, which are characteristic of the district. Spaced off by stout wire with a door that locks, he has rows of bins for washers, bolts and other of the smaller parts of trucks, with drawers and larger bins below. He has a 7½ horsepower air compressor, a 16-inch lathe with 6-foot bed, a drill press, portable electric drills, an acetylene welding outfit, Hauck burners, an air gun for riveting broken parts, two chain hoists, one of half a ton and the other of two tons capacity; hanging overhead shelves, supported by heavy iron piping for storing fenders, bodies and the like, to keep them out of the way, and long benches fully equipped with tools. He uses his electric forge, Hauck burners and air gun in frame work and axle repair.

He has a blue-painted rebuilt Ford passenger car with cab and box body, for a service car, on the rear of which is painted in yellow lettering: "At Your Service."

Brinser gives a twenty-four-hour service on any truck but a Packard or a Mack, having established a thirty-two-hour limit for these, including complete rebuilding of motor. That Brinser has made good and is confident of winning through, where others falter, is attested by the fact that he is planning to add a body-building department.



This is Brinser at Work in His Garage at Falls of Schuylkill. He Has an Unusually Fine Equipment for His Truck Servicing

in the case of dealers, to trucks they have not sold.

Investigation in numerous cases showed that a more accurate answer would be:

"Our mechanics won't do this work **because we haven't the facilities.**"

While now and then a dealer's service station was found to contain a few proper machines and tools for servicing heavy trucks, many of them were unfitted to give prompt service because of lack of equipment. A few seemed to think that about all that was necessary to take care of big trucks was an electric portable drill and a wrench or two. It looked like a buyers' strike against equipment suitable for the repair of trucks.

But as proof that the independent service station proprietor, who really wants to do this valuable and remunerative work, and who has the men **and shop facilities,** can be successful, take the case of J. W. Brinser, proprietor of Brinser's Garage, 4014-4016 Ridge Avenue, Falls of Schuylkill. Brinser likes to service motor trucks, heavy ones, too; it's his job and he is no shirker. What's more, he won't have shirkers around him. He goes on the plan that a mechanic who's afraid of a little grease—either elbow or axle—ought to go and treat himself to the presidency of a bank, or become a soda water dispenser.

So Brinser has both the men—for he made a point of finding them—and the facilities. He averages about nine expert mechanics and a blacksmith when business is booming, and if it becomes necessary for a period to cut down to all but the blacksmith, he does it—but still services the trucks.

Brinser's "regular" trucks number 340 and in addition to servicing this steady clientele during the year, he takes on all

Your truck was at our service station recently; we thank you to fill out the attached card and return to our general manager.

Any suggestion you may offer will receive consideration. We are endeavoring to improve the quality of service furnished our patrons. With your suggestions and co-operation we can satisfy all ..... owners.

This service station is maintained to service ..... owners like yourself as promptly, efficiently and economically as possible.

Assume an owner's loyalty and pride in your service station—and by mutual confidence and co-operation we can make the ownership of a ..... indicate motor-car satisfaction.

Name .....

Business Address ..... Telephone .....

Truck Purchased No. ..... Capacity ..... Date Delivered .....

Is Your Truck Satisfactory? .....

How Many Miles Run? ..... How Many Miles Per Gallon Gasoline? .....

How Many Miles Per Gallon Oil? .... How Many Miles on Front Tires? .... Rear Tires? ....

Is Your Present Truck Your First ..... ? Yes ..... No ..... How Many? .....

Has the Service Rendered by Our Inspection Department Been Satisfactory to Your? .....

Did You Receive Courteous Treatment? .....

Did You Ask Any Information You Did Not Receive? .....

Have You Any Suggestions to Make, Which, in Your Opinion, Would Improve the Service of the Inspection Department? .....

Has the Service Rendered by Our Service Department Been Satisfactory to You? .....

If Not, Please State Particulars: .....

Have You Any Suggestions to Make, Which, in Your Opinion, Would Improve the Service Department? .....

.....

.....

Remarks: .....

Signature .....

WE WANT YOU SATISFIED? ARE YOU?

Developing Sales Through Service Check-ups

Create satisfaction in service and the dealer incidentally creates easier resale prospects. The best prospects are those who come to the dealer's service station daily and leave satisfied. Three very good features of the simple system illustrated herewith are: That it enables the dealer to straighten out any minor troubles that may have developed with the truck; to check up service rendered; and finds new prospects. Where the owner replies that his truck has pleased him, and the truck is an old model with a high mileage, he is usually a prospect. Will this system make sales? Try it.

"Say It With Printer's Ink"

Don't be Afraid to Advertise Your SERVICE

Let Your Prospects Know How Your Satisfied Customers Like Your Service Work

THERE are two general types of dealers at present. One is selling trucks and not complaining that business is poor. The other is not selling and howling that "business is rotten." This condition prevails in any city. Now why is it that there are dealers who are doing as much business now as they did in the flush times? It may be contended that general business conditions are better in certain sections that there is, consequently, a demand for trucks. This would be a logical explanation were it not for the fact that some of these live dealers referred to are selling in sections where business is not reported as booming.

After analyzing a number of instances and scanning the merchandising methods, the writer finds that the dealers who are putting trucks over are not selling trucks but are SELLING SERVICE, are cashing in through satisfied customers, which are the best bets that can be placed. And these dealers are selling in the face of keen competition, some of which is of the questionable type, the cut price and big allowance for the trade-in. What these dealers are doing you can do, Mr. Dealer. You may say that this is a too optimistic statement, that general business conditions affect truck sales. So they do, BUT—there is plenty of business to be had if you will get out and dig for it. You must use intensified selling methods and call into play every factor making for sales, and the best seller of the day is SERVICE.

Merchandise Your Service—if Right

The great fault of the average truck dealer rendering the right kind of service is that he does not merchandise it. Your satisfied customer is a great salesman and an incident noted by the writer is quoted to prove it. On a certain holiday the writer had an appointment with a truck salesman at the latter's office. While in the midst of a discussion the door opened and a middle-aged man came in and walked up to a 2-ton chassis. The salesman made the usual greetings, etc. The visitor, after a few remarks, gave his order for two 2-ton chassis. Being curious I went into details of the sale and learned that the buyer was not on the prospect list, had not been approached, but decided on the make because a friend with whom he had discussed trucks said that the ——— company gave the best service in the city. But the dealer did not take advantage of the sale through service; that is, he did not make use of it and similar service sales by securing from the buyers through service a letter or testimonial that could be utilized in merchandising.

Effort is made by some dealers to cash in on the sales of trucks made to large business houses and particularly where there are repeat orders. This takes the form of displays in the sales room of lists of owners or in circulars or letters sent to prospects. This is all very well in its way, but we are selling trucks today, and will in the future, on the service rendered the user, so why not take advantage of the satisfied customer and MERCHANDISE YOUR SERVICE?

Originality Important

It should not be difficult or expensive to secure from your customers a letter or testimonial stating how he views your service and if you can have incorporated a little incident of how the service benefited the owner, all the better. Such letters should be full of snap and punch, not the cut-and-dried-form type. Try and put some originality into them because with many of your customers you will be able to write the letter and have them sign it. Another suggestion is to give the customer the points you wish brought out and have him incorporate them.

Try and inject the thought or statement that your service charges—labor rates—are honest value, that the service is reliable and dependable. Incorporate a line or two about your service station, its personnel and equipment. Emphasize these points. You can get your best customers to mention such facts if you are diplomatic. If your satisfied customer has not visited your service station get him in and introduce him to your service head. The latter ought to be able to sell him. And after he is sold—as he should be if your service policies are right—suggest that the customer mention his inspection of your station. If the customer is a big one, operates a number of trucks and employs a transportation superintendent, get after him along the same lines. And do not forget to give prominence to the customer's business which brings up the thought of merchandising the service.

Make an effort to obtain letters from all lines of business and particularly from the type of trade on which you are planning a drive. For example: It is stated by a number of dealers, who are putting trucks over at the present time, that chassis ranging from 1 to 2-ton are selling best, that the smaller business houses, such as produce and commission men, stores, etc., are the biggest purchasers. Go over your sales records and separate the various industries or lines of business and begin a drive on a certain type to obtain service letters, as previously pointed out.

Of Value to Sales Force

These letters can be employed one of two ways. They can be utilized by the salesmen in their calls on prospects or can be made use of in a mail campaign. If used in the latter way, it is best not to send but one or two and reserve the real punchy ones for the follow-up campaign by the salesmen. It is important that the street address and telephone number of the satisfied user be given in case the prospect desires to verify the statements. Some prospects WILL verify testimonials, therefore it is imperative that exceptionally broad claims be eliminated, otherwise the testimonial may "back fire."

Advertising vs. Advertising

Most dealers devote all their advertising in the newspapers and other mediums

How to Make Your Newspaper Advertising Count

to exploiting the truck they sell. Occasionally a line will be found buried in the copy about a service station or service, but it is always subordinated to the truck. The writer makes it a practice when visiting various parts of the country to scan the daily papers and read the advertisements of the truck dealers and takes this occasion to get out his hammer and knock the general line of copy used by truck dealers. Judging from the copy noted it is prepared by some outsider, whose knowledge of a truck is largely superficial, who believes a bunch of adjectives, verbs, etc., spread around the name of the truck, is what sells the truck. Maybe it does in a seller's market, but it is not registering very strong in the buyer's market.

"Canned" Copy Lacks Punch

While wielding the hammer, let us take a tap at the factory that supplies the small truck dealer with what is termed "canned" copy, copy that is made up for the entire country. Of course, if the factory is meeting part of the advertising cost it has a perfect right to prepare what it deems the proper copy, but right here the writer goes on record with the statement that the factory or dealer rendering service is overlooking a big bet when they fail to advertise it in display type.

There are two ways of advertising service. One is to make use of the letters from satisfied owners in a mail or personal call campaign and the other is to splash it in big type in newspaper copy. If you are giving the right kind of service, Mr. Distributor, dealer or factory branch, why be shy on telling the world that you do?

The reasons why some do not are as follows.

"Waiting until I get my new machines in, or until the place is cleaned up."

"Expect to move into larger quarters before long and am not strong for having customers see this place."

"Going to make some alterations and add new equipment, but until completed do not encourage visitors."

"Place would unfavorably impress prospect not knowing repairs and he would think we cannot turn out good work fast."

"Am installing new system and until it is working do not want any publicity on my station."

"Afraid prospect would compare my small place with ————'s big service station and be influenced."

What Owner Really Wants

These and similar reasons have been given when it has been suggested that dealers giving satisfactory service advertise their places and service. Some dealers take the stand that unless they have a mammoth, new, up-to-date service station they should keep the customer away from it and say as little as possible about service. But the customer, the kind you want to hold, is not impressed with an elaborate service station, if the bills are in keeping and the service not what it should be. What the customer desires is **efficient work, a square deal, full value for the money,** and the knowledge that his disabled truck can be placed in service again, quickly and at the **minimum cost.** It isn't necessary to have a big service station. Large service stations do not always mean service that satisfies. In this big country of ours will be found the small shop where the mechanics can turn out real and satisfactory work and at a price consistent with good work. These little shops grow from small to large ones and are successful if they maintain the policies which made them successful at the start.

The great trouble with the right kind of service stations and repair shops is that they depend too much upon satisfied customers to sell their service. The service station, small or large, that is rendering the proper service, should advertise it as much, if not more, than the truck represented. The time is not far distant when the service station will be sold, merchandised equally as strong as the truck sold, and the broad-minded, progressive dealer will place himself on record, in print, as selling service and subordinate selling trucks.

The Buyer of the Future

Advertising the service station is going to develop competition among truck dealers and the right type of competition. Many factory sales managers complain they cannot secure the right type of dealer—the stable business man—but the class desired will be developed through service and advertising. The service as suggested will be the acid test of whether service is to be the keynote of sales in the future or not. The writer believes, and his belief is founded on a study of the methods of the truck industry, that the future buyer of trucks, the purchaser in 1922 and thereafter is going to buy on what it costs him to maintain his trucks, not on a design or combination of parts.

The day is fast approaching when the service station cannot be relegated to the background as it has in the past. The right type of service station, correct and stable service policies, proper equipment, which reduces time and labor costs, personnel and service organization, are going to be as muchly advertised as the 57 varieties of relishes and pickles. So, if you are rendering real service, do not be afraid to advertise it broadcast. If your service is right it will bear inspection.

Do not do as one big passenger car dealer did in New York City. He erected a mammoth and expensive service station and ran a page advertisement in the leading papers announcing his claims and inviting the public to inspect his plant. But it is said that only the chosen few ever saw the real service station, the place where the service is rendered. It is alleged that the owner was shown the pretty waiting rooms, entrances, etc., but not the departments where the "grease ball" functions. Usually the truck owner desires to see the place where his money is actually being spent. Proper service policies and equipment, and the personality of the service manager will sell the owner. So give the service station an opportunity, Mr. Dealer and Distributor, to sell itself to the public in your advertising copy. But do not advertise unless you can substantiate your claims.

Educational Copy Will Sell

As for copy it is suggested that illustrations be used which will be educational and drive home your arguments why your service is second to none. A series of ads can be laid out that will cover step by step your service policies, that will show the public why it gets a square deal. There can be incorporated in the copy some punchy, snappy talks, and illustrations, proving how labor operations are reduced, how inspections, systems, etc., to eliminate to the maximum the human equation. Some day the writer hopes, and expects, to find a dealer who is laying his service cards on the table for the public to read, and who is cutting a big chunk out of that old man SALES RESISTANCE by SELLING and ADVERTISING SERVICE.

Showing Two of the Fourteen Three and a Half Ton Motor Trucks Recently Completed by the Indiana Truck Corp., Marion, Indiana, for One of the Largest Ice Cream Producers in the States

These trucks have a special wheelbase of 184 in. and are specially equipped with inclosed cabs, Prest-O-Lite outfits, and speedometers. The bodies which incorporate the A. B. C. refrigerator system are made by the Anheuser-Busch Sales Corp., St. Louis, Mo.

Did You Ever Try

THE HONOR SYSTEM IN SERVICE?

Put It Up to the Customer's Honor! Give Him the Facts. If He is Honest He Will Pay; He Will be a Booster

Combine Mechanical With Executive Ability and Personality and You Have a Service Manager Who is a Real Asset

By C. P. SHATTUCK

LAST July Taber-Rodgers, Inc., flung their shingle to the breeze at 1112-1114 Main St., Hartford, Conn., and the banner informed those who read that the concern represented the Duplex and Republic trucks. Certain supposedly well informed truck dealers in Hartford smiled when the news percolated through truck circles that a new dealer had come to town. A few of the egotistical, those who always predict failure for the newcomer in their midst, shook their heads mournfully at the news that the new company had taken over a large building of several stories. "This is where Russ Taber stubs his toe," said the pessimists. "Taber is due to lose out on his new venture," said another. "Too bad Russ isn't satisfied with letting well enough alone," opined a third.

Some dealers are selling trucks in a buyers' market. Others are exceeding the sales of 1920. And a number say that trucks are moving mighty slow these days. Many salesmen are discouraged; that is, the order-taker type that prospered during the war days or in the sellers' market. Why is it that dealers can be found in those sections where sales are reported slow that are doing better than they did a year ago? Why is it that the selling dealer is chock full of optimism?

Let us introduce Russell Taber to the readers of the Commercial Car Journal. Some 12 years ago he was unknown in Hartford in automobile circles. By stable business policies, the foundation of which was service that satisfies, he has built up a business selling Reo passenger cars and trucks in Connecticut that has made him the leader in the Nutmeg state. He has a model sales and service station of large dimensions on Allyn St. which the writer inspected and which is complete in every respect for merchandizing and servicing cars and trucks represented.

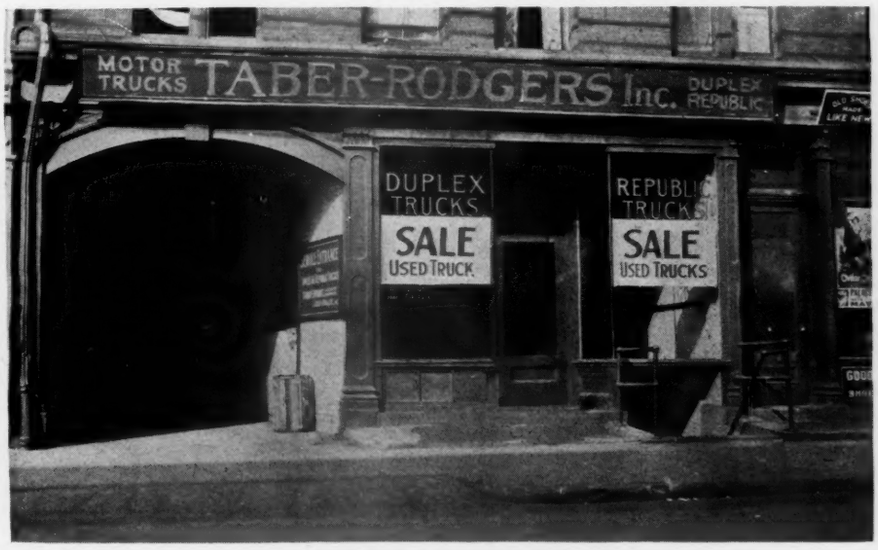
Russ Taber is a keen business man and very analytical. He believed that there was a market for trucks of heavier capacity than the line he represented and decided to take on a new line, so formed Taber-Rodgers, Inc., referred to, to handle the line. He selected Clarence M. Rodgers, long in experience in merchandizing trucks, and placed him in charge as general manager. That was last July. Today the new concern despite the reported slump in truck sales is selling trucks and expects to sell a lot more before the snow flies.

The interesting feature of this concern is the fact that it reversed the conventional order of dealers: that is, instead of first building a sales organization and selling trucks, and then taking up the service question, it BUILT ITS SERVICE FIRST AND SOLD TRUCKS AFTERWARDS. This explains why some of the Hartford truck dealers were surprised to note that the new concern in taking over the new building also took over the ground floor of a dwelling in front, converting it into a sales office. If the reader will refer to the accompanying illustration he will see that the office is small, just slightly wider than the entrance to the service station at the left.

While the office is small it is neatly arranged, containing as it does the bookkeeping department, private office of Mr. Rodgers and a waiting room. The front is inconspicuous and were it not for the window signs would not attract any attention. The location is not on automobile row but on a quiet street. There is no elaborate sales room display. The expense of maintaining an expensive show room is converted into service. Mr. Rodgers has been in the truck industry long enough to realize that the business man is more interested in what it costs him to operate and maintain a truck than in pretty show rooms, etc., that do not sell trucks and the work they do.

Trucks are not sold by the company but service and it is the same type of service that made Russ Taber the successful dealer he is today. That is why the big building was taken over for a service station and little money spent for the office and sales rooms.

In laying the foundation of the service station Mr. Rodgers was careful in his selection of a service manager. He did not desire one whose ability to make a mechanical unit perform tricks was the chief asset, but



Entrance to Office and Sales Room of Taber-Rodgers, Inc., a Hartford Distributor of Duplex and Republic Trucks

The entrance to service station is shown at left, and the building is a modern structure equipped to render first-class service

a man who had personality, who could build up an organization and keep it functioning smoothly. He also desired a man who could meet the customers and sell them the service policies of the company as well as handle the numerous problems that arise in service with success. Such a man was not easy to obtain but after a while he was secured.

The service manager of Taber-Rodgers, Inc., is the whole works to use a slang expression. He has wide authority and should a customer dispute a bill or do the many little things which try the patience and tact of the service manager, it is up to the service manager of Taber-Rodgers to satisfy the customer. If the service manager believes the customer is right or if policy demands an adjustment, it is given without the usual red tape wound about service adjustments.

Eliminate Sowers of Discontent

When this service manager assumed charge—there was a predecessor—he had to do more or less house cleaning; in fact, let out one high grade mechanic because he placed himself ahead of the company by breeding trouble with another mechanic to whom he had taken a dislike. By eliminating the slacker and trouble maker types of men and replacing them with mechanics having the interest of the company at heart, the service manager built up a machine that functions.

The service policy from the start has been to sell trucks on its good name or good will. The policy is that the customer is always right. If a customer comes in to this day and disputes a bill the time cards are shown him to prove that the time was honestly spent. Effort is made to prove to the customer that he is obtaining honest value for his money, that the workmen are capable and efficient. Should the customer take the attitude that the bill is too high he is told that he can adjust it to his own satisfaction, pay that which he thinks is right, and if he desires he can pay nothing.

Anticipating the criticism of some readers that this would be a suicidal policy for a dealer to pursue, that there is a type of customer who would either cut the bill in half or not pay at all, it is explained that Taber-Rodgers doesn't sell to this type. And during the time they have been in business they informed the writer that but one customer took advantage of the offer. The interesting part of the story is that this customer came back after three months with work, paid his bills without question and sent many good prospects to the company, some of which have resulted in sales. And the customer is a great booster for the service policies. It may be that his conscience worried him and that he desired to make amends. And again it may be that the service sold him. Probably both.

Why This System Works

This leaving it to the customer would not, perhaps, be a good policy with every type of customer but it is with the Taber-Rodgers clientele, for they prefer to let the other dealer make the sale to the undesirable type. What the company is endeavoring to do is to sell trucks to the right concerns. By right companies is meant stable business houses or business men who buy on honest value and realize that the cost of operation and maintenance can be high if the truck is not properly serviced. The salesmen are taught, educated to the value of picking good prospects and frequently report on leads that the prospect is not a Taber-Rodgers type. Of course this means that sales are lost but it doesn't worry the company, for they know that SATISFIED CUSTOMERS MEANS VOLUME SALES. It takes courage to turn down a lead but the company believes that they will sell more trucks in the end and have less gray hairs by sticking to this policy.

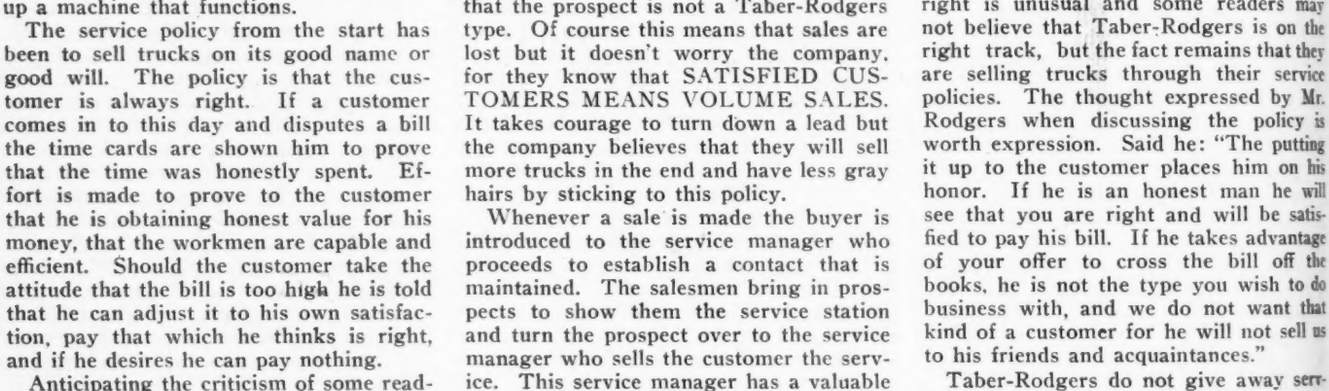
Whenever a sale is made the buyer is introduced to the service manager who proceeds to establish a contact that is maintained. The salesmen bring in prospects to show them the service station and turn the prospect over to the service manager who sells the customer the service. This service manager has a valuable asset in that he has a very good memory. When the prospect buys and comes into the service station the service manager is able to recall the man's name. This pleases the prospect. Details of service matters also help the service manager and the salesmen.

The service methods, repairing, forms, etc., are conventional and include road and shop inspection. What the Taber-Rodgers company does that is highly commendable is the sending of its service manager to the truck factories and to the unit factories of the units entering into the trucks sold. The service manager is provided with the proper introduction to the right people at the factories and this direct contact is extremely helpful to both the dealer and factory. It enables the service manager to get an insight as to how the chassis is constructed, how units are built and assembled and to observe factory service methods which the Commercial Car Journal has been publishing for nearly two years. Certain problems with which both the dealer and factory are vitally concerned can be discussed, and there is no doubt but what the dealer and factory both benefit by such visits. A capable service manager should be of assistance to the engineer, for the former has the customer contact that average engineer and factory lack.

Place Him on His Honor

The policy of the customer is always right is unusual and some readers may not believe that Taber-Rodgers is on the right track, but the fact remains that they are selling trucks through their service policies. The thought expressed by Mr. Rodgers when discussing the policy is worth expression. Said he: "The putting it up to the customer places him on his honor. If he is an honest man he will see that you are right and will be satisfied to pay his bill. If he takes advantage of your offer to cross the bill off the books, he is not the type you wish to do business with, and we do not want that kind of a customer for he will not sell us to his friends and acquaintances."

Taber-Rodgers do not give away service. Service is paid for and on a cash basis. This the customer understands.



The Latest, a Motor Truck for Supplying a City's Water Supply

As a result of a recent electrical storm the motors used at the pumping station of Clintonville, Wis., were burned out and, in the emergency, the fire truck was called upon and filled the bill in a very efficient manner. The truck, a FWD fire truck, pumped water into the supply tower, shown in the distance, 164 ft. above the pumping station and approximately one mile away

The Dealer *CAN* Increase His Sales

by Adopting the

VOCATIONAL SELLING PLAN

It Eliminates All Guess-Work and Places the Salesman on His Guard

THE future of the industry can not be built up upon any hit or miss plan of selling motor trucks. Trucks must be sold in a more or less scientific manner. The vocational selling plan, although not a new idea, is certainly a great step forward in motor truck merchandising.

It is refreshing to note that another company has seen fit to adopt this method. The Duplex Truck Co., Lansing, Mich., has recently completed what may justly be termed one of the most complete analysis of what vocational selling really means to the dealer.

A copy of this company's book reached this office about six weeks ago and although we were tempted to release an article on it in our May issue we felt that the close relationship which this subject bore to service entitled it to a place in our special service number.

Salesmen should remember that motor transportation is what they are selling and not the motor truck chassis. The chassis is but the **MEANS TO AN END,** and satisfactory hauling at the least possible cost is the **REAL END** to be achieved.

Vocational **SELLING AS APPLIED TO THE MOTOR TRUCK INDUSTRY** is the name of this book, which contains the merchandising plan offered by the Duplex Company to its dealers. It suggests a practical method of getting away from salesmen's guesswork and owner's dissatisfaction.

Order-Taking Days Over

The time has come when the salesman must render the prospect a real service. He must be able to intelligently advise the prospect and assist him in solving his transportation problems. Trucks, in the future, must be sold on the basis of economy; on the greatest amount of efficiency with the least possible cost, before both dealer and buyer will derive a mutual benefit.

This book details a fund of invaluable information made readily available for reference by a division of the subject into 18 distinct chapters. Among the most important topics discussed in these chapters are: The vocational plan and what it means: vocational classification; territory analysis; a chapter on locating prospects; another on visitation and solicitation of prospects; another on transportation surveys and selecting the right truck; and others on advertising, circular letters, and truck operation cost records.

Three pages are devoted to an introductory explanation of the vocational selling plan. It is really an assembly of truths and facts that all should know. The presentation says in part:

"We have spent too much time telling about spark plugs, axles, transmissions, etc., instead of showing the buyer the real results to be obtained by the proper use of the motor truck.

"You know any method of selling must benefit both the seller and the buyer if it is to be a long-lived method.

"Any open-minded man will ordinarily welcome helpful suggestions and constructive advice which is really applicable to his own business. Schools of scientific salesmanship emphasize the urgent importance of proper approach to a prospect.

Show Him How He Can Save Money

"Assuming that every business man is interested in his own business problems, it is obvious that the best method of approach should be along the lines of familiarizing yourself with the business man's individual transportation problems.

"We assume that the average prospect is a successful business man with a fair general knowledge of transportation, and it is our idea to take the business man into our confidence, tell him why we recommend a certain truck with certain equipment rather than attempt to sell him a truck without supplying the reasons why.

"Stated briefly, it is our contention that the salesman's efforts should be directed along the lines of the individual business of the buyer.

"Eventually, catalogs will be eliminated and an individual transportation survey will be made for each vocation."

Some ten pages are employed in the vocational classification. Upon glancing over these pages, which is divided in six general groups and twenty-one subgroups, the reader is impressed of the important role that transportation plays in all of the varied vocations; whether creative or productive, some form of transportation is utilized. This classification will enable every salesman to immediately index his prospects according to vocation, after which, armed with the proper ammunition, obtained from the the Duplex Research Department and from personal investigation, the salesman can sell his prospect on the need of transportation. He is enabled to convince his prospect that he is selling transportation and "that the motor truck is only the means to an end."

On Developing a Store-House of Facts

One of the chapters of the book is devoted to a description of Duplex Sales Research Department, which is designed to aid the salesman by securing and compiling data and information pertaining to the transportation requirements of the various vocations. This department can be called upon to assist in diagnosing all transportation problems, such as analyzing the transportation problems of prospects and prescribing trucks to meet the requirements of individual cases. Information of merchandising value is also brought out in this chapter.

The book cautions that the old passenger car method of determining the value of a territory by considering the population of a territory, the wealth per capita, and the number of cars in use per capita as a basis of circulation, is obsolete and not applicable in ascertaining the sales possibilities from a truck standpoint. It maintains that the demand cannot be gauged by the number of trucks in use, but rather by the requirements of motor transportation in the various industries

ON SELLING

The selling of motor trucks is practically no different than selling any other commodity. The great trouble in the past has been that dealers and salesmen have been selling motor trucks as chassis units, instead of selling to the buyer the need for transportation. Transportation must be first, last and all the time the main objective, and the truck the means by which the buyer reaches the objective point.

and vocations in a territory. The book advises, instead, a thorough personal investigation, in which direct personal knowledge of each individual industry, knowledge of the product manufactured or handled, knowledge of the volume handled, the facilities for handling, financial standing and other details is gathered as a basis of analysis of truck sales possibilities. Study of the common sources, such as city directories, telephone books, etc., alone, is not satisfactory.

If Transportation is Needed, a Sale Will Follow

In connection with this analysis, the book says:

"Wherever a motor truck is really needed there will always be provided the means of purchasing on a substantial basis of payment. As a general rule, therefore, the present truck owners in your territory cannot be considered the best prospects, unless considered purely from a standpoint of the industries which they serve and the added outlets gained by the present use of trucks in those particular vocations.

How to differentiate between a **genuine prospect** and just a high-sounding name, a matter, little in itself, but which has caused many a salesman to lose valuable time because he refused to recognize its importance, is the subject treated in the chapter on "How the vocational plan helps find prospects." Determine whether a firm requires transportation and then list him as a prospect. The book points out, "that it makes no difference whether a firm is worth $5,000 or $5,000,000. If it really needs a truck, then it is a prospect."

The chapter further states that there are many industries in a territory that may never have occurred to a salesman as motor truck prospects, and again, there are many industries that believe they need trucks when they actually do not. Personal investigation based on vocational classification will enable the dealer to determine in which class to place various businesses in his territory. The system prescribed demands that no name should be considered as a prospect until a sufficient investigation has been instituted of that business to determine the eligibility of that name as a truck prospect.

A Good Name Circulates Rapidly, Through Industrial Centers

"When the industrial community of your territory find out that you are in business to supply the complete transportation plan instead of merely a truck chassis, you are going to have no difficulty in finding prospects."

In preparing the book the matter of solicitation and visitation of the prospect was considered of such moment and importance in this most modern scheme of selling as to warrant special emphasis. What information should be sought and what the salesman should talk about is detailed fully and clearly. The following practical observations on this subject are advanced:

"It is a well established principle of human nature that every individual is above everything else interested in himself. The business man is much more interested in his own business problems than he is in yours. The ordinary type of visitation and solicitation will make little progress in the presence of a busy customer, with problems of his own to solve.

"The vocational plan provides an entirely different method of approaching the prospect, a method which will not only be welcomed by purchaser but will be of great benefit to him because it means the proper selection and equipment of his transportation units, consequently a solution of his transportation problems.

"Before your salesman is ready to talk truck to the prospect it is vitally necessary that a great deal of information must be secured either from the prospect himself or, if in the case of a large company, from the proper persons in the company who have charge of the transportation of the merchandise. It would be necessary to know the nature of the merchandise manufactured and handled, the daily volume, how the merchandise is handled, whether in bulk, barrels, boxes or packages, the facilities for loading and unloading, length of the haul, kind and conditions of the roads, facilities for giving mechanical service to the units and a great deal of other detailed information, all of which is most important in order that the proper equipment may be supplied.

"All of this information is to be secured by your salesman on a blank questionnaire which we propose to furnish to you covering each prospect which you visit. Under this plan, the salesman on his **first** visit emphatically impresses on the prospect that he is not there to sell trucks, but rather that he has come to make some inquiries in reference to the man's own business. It is a well-known fact that a great number of salesmen under the old plan have so annoyed the prospect by attempting to convince him that their truck is better than any other that the prospect soon reaches the point of distraction where he does not want to talk to any more truck salesmen. For this reason it is obvious that you impress upon the prospect that your visit is not in the capacity of a motor truck salesman, but as a sales engineer to aid him in reducing his haulage or delivery costs, and to counsel with him regarding motor truck transportation in general, the interview will in most cases be readily granted.

"The salesman who approaches the prospect on the foregoing stand and conducts himself as he should, will not only secure the confidence of the prospect, but will find he has opened the way to frequent return interviews, all of which will be utilized to either secure or give further information concerning the prospect's transportation needs.

Success Demands Study of Prospect's Business

"Under the vocational plan when properly handled, it will be clearly seen that if the salesman prepares himself with the proper study of the prospect's transportation problems he puts himself in a position where he can intelligently advise with the prospect on such problems, and he will be welcomed by the prospect on each visit. The question of the truck decision will automatically fall into the natural scheme of things, however, and it is almost certain that if the salesman has intelligently and properly advised the prospect as regards his transportation problems and has shown the prospect where certain equipment will enable him to save money in handling his merchandise, there is very little doubt as to any serious questions being raised concerning the truck itself. The customer will take it for granted that if the salesman has made so thorough an investigation and study of his own problems that he must naturally be handling the right sort of truck to fit into the completed plan.

The subject of catalogs and their uses is treated in a fashion that will leave a lesson with many who have used trade literature improperly in the past. When and how catalogs should be used is clearly defined in this chapter.

"The present type of catalog is and has been at its best only a mechanical description of the detailed construction of the truck chassis itself. These catalogs have failed to provide that information concerning each owner's problems, which is most necessary in the proper selection of a truck.

How and When Should Catalogs be Employed?

The catalog should be the last piece of literature to be presented to the prospect. After his transportation problems have been fully solved and his mind convinced that you understand beyond any question of a doubt just what type of equipment he needs and when he is ready to leave the question of selection to you, as will be the case when the vocation is properly handled, it will then be in line to discuss the general mechanical construction of the truck, providing the purchaser is interested in mechanical details.

The purpose of the Duplex sales research department is to co-operate with dealers in assembling all manner of information on truck operating costs, and by analyzing individual requirements of prospects having problems peculiarly different from the conventional. To accomplish this effectively dealers are provided with four sets of questionnaires, which,

TRUCK vs. PASSENGER CAR SELLING

The first thing necessary to sell a motor truck is to find the prospect. It is the usual procedure in selling passenger cars to discover who possesses sufficient money to purchase a car and then approach him with the usual story of fine points.

But to merchandise the motor truck an entirely different course must be pursued. It makes no difference whether a man is worth $5,000 or $5,000,000. If he really needs a truck, then he is a prospect.

The all-important thing is to find out whether the man needs transportation.

they are urged, should be filled out as promptly as possible. One of these questionnaires is for obtaining records of trucks now in operation. The other three are transportation analysis questionnaires; the first applying in a general way to almost any transportation problem; the second, to the problem of a prospect who is in the paving and road construction work; and third, to passenger bus routes, stage lines, and other motor routes.

Process Employed in Making Individual Surveys

When the questionnaires are filled in they are forwarded to the research department, which then makes a survey of the transportation work to be done. The book continues in detailing the operation involved as follows:

"When the questionnaire is returned to us properly filled out, our Research Department is then able to make up a survey for each customer and this survey will contain, first—a general analysis of the prospect's business as indicated by the questionnaire; second—a cost chart showing the cost of operation of such equipment, not compiled from some other part of the country, but in the same zone in which the prospect is located; third—testimonials of Duplex users who are using their equipment for the same kind of business, not for some other kind of work; fourth—illustrations of the exact type of truck and equipment which we propose to furnish, and fifth—supplements showing the mechanical details of such equipment. These will be bound in a neat portfolio cover and the prospect's name, address and vocation placed on the cover.

"These will be forwarded to you in response to your questionnaire and you will then have pieces of literature of real value to present in person to the buyer and he cannot help but be interested, because of the fact that the survey contains a personal letter to him and will contain information covering exactly the thing that he is most interested in.

A Misapplied Truck Brings Bad Repute

Unless a truck can be properly and profitably used it is advocated that the dealer should not make the sale. It is a foregone conclusion that misapplied use of a truck only brings loss to the dealer and bad repute to the manufacturer. This matter is touched fully in a chapter covering the dealer's relation to his salesman and the salesman's obligation to the buyer.

Regarding this delicate matter, the book says:

"The requisite today of a successful truck salesman is that he apply himself to the mastering of the difficult problems that present themselves in studying the various industrial or vocational transportation needs.

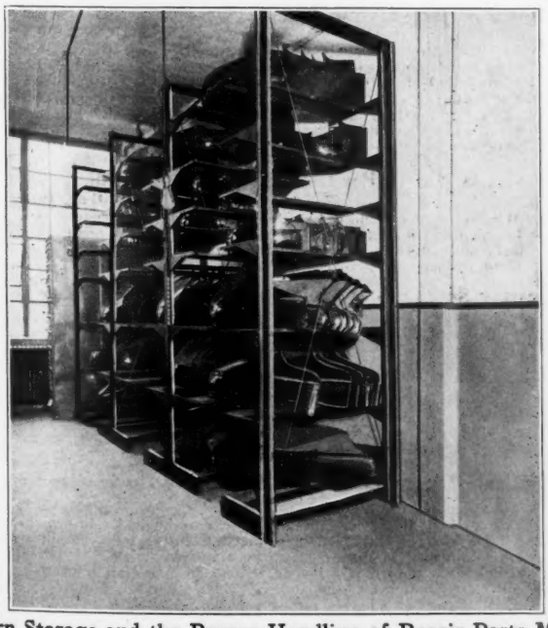
"Occasionally our transportation surveys will develop that a prospect does not need, or cannot use profitably, a motor truck. If a commission salesman is working on the prospect it is indeed a sudden blow to the salesman to see his commission slipping by. But this is one of the most vital aspects of the truck business. A truck improperly sold or misapplied is bound sooner or later to come back into the dealer's possession. What happens? The salesman loses his commission. Nine times out of ten the customer is sore over trucks in general and particulalrly this make of truck, so that the salesman in addition to losing his commission loses a good booster and customer, and the dealer loses the profit on the sale. Let the salesman answer the question, 'Does it pay?'

"By the vocational method the salesman will rarely if ever lose a customer from this reason, because with the proper operation of the plan the truck cannot be misapplied."

Plug the Circular Letter Leak in Your Overhead

The flagrant waste in money through the promiscuous mailing of circular letters is strikingly brought to the fore in the book's advices against such activities. The average business man is not interested in what you have to sell unless you can show him where he needs it in his business, and how it will mean a profitable investment to him. The book points out that most adverising of this type reaches its final resting place in a waste paper basket and that if this kind of advertising must be employed, it should be done only after careful study of the vocational list and selection of the most likely prospects to whom individual typed personal letters be sent. These letters should be brief, setting forth the fact that transportation is being sold and not trucks, and they should conclude with a request for an interview so that "you can show him in person what you can save for him in his business per year in dollars and cents."

The Duplex company's objective is evidenced in every chapter of this book—its advocacy of selling motor transportation equipment. Firmly convinced of the need of more intelligent merchandising along these lines this company is extending its utmost in promulgating throughout its dealer organization the lessons of experience and investigation. Education of this nature will work wonders toward stabilizing an industry which has been more or less haphazard in the distribution of its product.



Modern Storage and the Proper Handling of Repair Parts Means Judicious Economy in Space, Ready Accessibility to Parts and the Maintaining of a Record of Parts on Hand Without Involving an Expensive Stores System. Control of This, the Service End of the Business, Which Can be Gained by Suitable Equipment and System, Will Increase Satisfaction of Customers, That in Turn Will Increase Sales, as Well as Parts Business.

The accompanying illustrations show the manner in which one service station, equipped with steel racks and bins, avoids confusion by system. The size and capacity of this equipment, which is manufactured by the Durand Steel Locker Co., 76 W. Monroe St., Chicago, Ill., is obtainable both large and small, according to requirements. The left-hand view shows a rack covering a floor space of 17 ft. x 4 ft. and 12 ft. high in which from 250 to 300 fenders can be stored. The shelves are adjustable. The right-hand view shows another style of storage for motor parts, transmission parts, etc., and accessories. Note the counter extensions, and label cards for the maintaining of a perpetual inventory system.

Are You Looking for

BUSINESS BUILDING HELPS?

Then Consult This Index

It is a Compendium Comprising Policies, Systems, Suggestions, Ideas and Details of Modern Business Organizations in the Servicing of Motor Trucks and Kindred Parts

It contains a fund of information, and is invaluable to the dealer wishing to refer to his file of Commercial Car Journals for the solution of any of the problems of service that daily confront him.

We suggest that the dealer remove the following outline and place it where it will be readily available for reference.

Success in business depends on, and demands, knowledge; and knowledge is obtained through personal and impersonal experience. Know what the other fellow is doing and, if you believe that his methods are practicable, incorporate the high lights of his policies in your business.

If for no other reason than in the interests of your own business, see to it that each member concerned in the well-being of your business has access to your file of Commercial Car Journals and the following index. It's bound to bring results.

A Practical System for Conducting a Service Station
July, 1918; Page, 41
This article, well illustrated with comprehensive forms, service station layout and general illustrations, explains in detail how to organize and maintain a truck dealer service department. It should be of particular benefit to the embryo dealer. Knowledge of the efficient methods prescribed in this article will even be worth reading by the most experienced dealer.

Garageman Will Furnish Truck Service at Fixed Rate Per Annum
Aug., 1918; Page, 54
A service idea is outlined in this article that will enable those wishing to engage in the selling of trucks, or those already engaged, but who have not sufficient capital to stock spare parts or equip a repair shop to render satisfactory service. Plan of grouping several interests under one roof.

Sell Your Truck at a Profit and Give Service
June, 1919; Page, 15
Remarks pointing out the deleterious effects of unethical business methods pursued by some dealers. Convincing language bringing out the throat-cutting results of attempting to cut both prices and extend service. Do one or the other.

Dollar-a-Month Ignition Service for Truck Owners
July, 1919; Page, 62
Outline of ignition service being rendered to Chicago truck owners at a cost of $1 per month. The plan is excellent, the elaborate system extending to owners almost unbelieveable service.

Keeping the Customer Satisfied
Sept., 1919; Page 87
Repair service at "flat" rates, follow-up system and bureau of adjustment represents the meaty topic discussed in this article. It also shows how the dealer, who instituted this system soon built up a flourishing truck trade.

Truck Sales Must be Backed Up With Service
Sept., 1919; Page, 89
Shows how one dealer built up a large business; what he attributed his success to; how he divorced his trucks from his passenger car organization; how he obtained the prospect's confidence and sold him on transportation; and how he built for the future in the organizing of an ingenious service system.

It's Service That Counts
Sept., 1919; Page, 96
This article shows pointedly what service means to the owner. In it is outlined the system employed by a western dealer in extending service to his customers.

Quality Service and Cut Prices Will Not Mix
Nov., 1919; Page, 67
Here's a good article on the merchandising of motor truck tires. Some good pointers on obtaining leads. How an owner was sold on the quality-plus-service policy. Records of sales and service of tires sold proves invaluable.

Service and Accessories Sell Trucks
Nov., 1919; Page, 80
This article tells how one dealer in handling accessories and rendering quality service mixed in with a little "pep" constructed a profitable business.

Are the Present Service Station Methods Conducive to Sales?
Dec., 1919; Page, 3
In this article the writer has endeavored to show the imperative need of a standard service policy which will be honored by the whole industry. Such a condition would be particularly interesting to the small dealer who needs such assistance most of all.

Service Relations Between Accessory, Parts and Assembly Manufacturer; the Distributor; Dealer, and Owner
Dec., 1919; Page, 15
The above is the title over a number of pithy and vital extracts on the matter of service taken from a discussive address delivered by a service manager before one of the Service Managers' Conventions.

How a Service Station Handles Service
Dec., 1919; Page, 100
In this article, which is well illustrated with various shop views, repair shop forms and an ideal layout of the ground floor of a dealer's establishment in which ample provision has been made for a real service station, the business ethics, service system employed, shop departmentization, parts room arrangement, employe co-operation and good will, and tire service are thoroughly discussed. The lesson contained in this story is a good one.

Service is Ninety Per Cent of the Truck Trade
Dec., 1919; Page, 104
What one successful dealer believes to be the prerequisites of success is briefly but completely outlined in this story. He makes no bones about facts and advances a well-defined explanation as to the meaning of the word service. In short; service—bank account.

Meeting Service Station Requirements Where Space is Limited
Dec., 1919; Page, 105
The arrangement of the parts, stock cards used and method of keeping record of parts, etc., is brought out in detail in this article. It shows how sales and service departments are combined in one building despite the smallness of size. Proper location of parts room is shown to be a vital issue and one which requires much consideration when planning the layout. Illustrations, diagrams, forms and layouts are interspersed throughout the article and helpfully lend themselves to the reader wishing to get something out of the article.

Triplicate Letter System Found Effective in Service Department
Dec., 1919; Page, 117
The method of service pursued by a certain dealer in which a triplicate letter system is employed in connection with repair jobs before and after job is finished is discussed under the above title. A periodical supervision also adopted by this dealer has been found to promote reliability and lessen the cost of upkeep.

Need of More Highly Trained Mechanics
Dec., 1919; Page, 118
In this article a man who knows, analyzes and outlines the importance of and the relation of service to success and prestige in the automotive industry. In this outline, which is the result of experience and study, some of the following theories, explanations and suggestions are advanced: Cause of the ambiguous misunderstanding of just exactly what service means; service is merchandise; the problem of the development of skilled craftsmen; need of incentive for craftsmen; difference between service and manufacturing; and valuable help of local service associations.

There's a Big Difference Between Service and "Free Service"

Dec., 1919; Page, 126

In this article the writer endeavors to show where the dealer who encourages "the something for nothing" or "free service" line of sales talk gets off. Free service is not consistent with permanent or successful business. Read this article and learn of the dire results of such practice, and of effective remedies for correcting them if in vogue.

Efficient, Space Economizing Method of Quartering Parts for Dealers With Small Establishments

Jan., 1920; Page, 64

How one dealer devised a practical scheme of arrangement in which large and small parts are satisfactorily disposed and kept constant tabs on through the use of a perpetual inventory is the matter treated in this story.

A Flat Rate System of Estimating Repair Jobs That Proved Successful

Jan., 1920; Page, 65

This article shows how kicks are eliminated by being able to tell a customer just exactly what a job will cost. Also, how the usual objections to a flat rate system are avoided.

The Vim Method of Helping Dealers in Small Towns

Feb., 1920; Page, 47

This article explains a simple stock-keeping system and practical routine to be followed in repairing trucks. The system outlined and the procedure advised is greatly simplified by comprehensive forms which accompany the article.

How One Dealer Overcame the Short-comings of His Predecessor

Mar., 1920; Page, 17

Many features commonly neglected by dealers are brought to light in this article. Shows how one dealer, after thoroughly investigating the conditions resulting from the unprincipled methods pursued by a former dealer, inaugurated a system in his territory that effectively solved the service problems and stimulated farm sales. The article is well illustrated.

It Isn't Any Old Bus That Will Do for a Service Truck

Mar., 1920; Page, 38

In which it is proven that the spic-and-span service truck is a valuable asset in the dealer's service department. Worn-out passenger chassis are in the discard. Details concerning construction, which is of a special nature necessitated by heavy-duty service, equipment, arrangement, and essential parts carried.

Keeping the Truck Owner Posted as to the Condition of His Trucks

Mar., 1920; Page, 108

Details of a novel idea of following up each truck purchase with a well-prepared good-will letter impressing purchaser of the dealers' co-operative intentions along the line of an equitable and well-founded service policy. This simple idea has resulted in an enlarged clientele and has reduced many misunderstandings.

What Kind of a Service Policy Have You?

April, 1920; Page, 17

Among other vital subjects the matter as to what constitutes an ideal service station is comprehensibly discussed in this article. Service of the best kind is assured to all owners as a direct result of harmonious relations between the repair-shop men and the employer, and a clear understanding by them of the company's policies. The mechanics are given a incentive in that they share in the profits and are promoted as a reward for efficiency. The big family plan is practiced, making for intimacy and co-ordination. Uniform service is rendered throughout. Well illustrated.

An Efficient Service Station is a Big Factor in Building Up Truck Sales

April, 1920; Page, 90

A motor truck that enters this service station can get anything. Nothing is overlooked that will put speed into work going through this shop. A complete supply of parts is carried and every detail in equipment is provided. Repair shop is systematically laid out, which is efficacious to both dispatch and accuracy.

The One-Man Shop vs. the Large Service Station

May, 1920; Page, 55

This article describes one method of retaining that personal touch in service repair relations which is so frequently lost by large service stations through the lack of interest on the part of the employes. Not only do the mechanics attend weekly meetings, but are encouraged to consult any department head on any matter involving differences in policy. System of checking up all service work renders the term "complaints" obsolete. Investigation as to the operation of this service department is well worth the inconvenience.

Making an Asset of the Lost Prospect

May, 1920; Page, 58

Replete with real follow-up letters. Story of how one Philadelphia motor truck dealer combined service and a follow-up system to get maximum results. How the "Bought Another Car" prospects, usually considered a minus quantity in the prospect file, is utilized to profitable advantage. How perpetual reminders of ideal service practices drum up business, etc.

Selling the Customer on Your Service First

June, 1920; Page, 38

Many good pointers for the young truck dealers concerning such topics as the handling of sales, establishment of real service and dissemination of a correct interpretation of the word service, courtesy and the proper way of handling used trucks up for sale.

Dividing the Service and Sales Departments

July, 1920; Page, 54

Some reasons why a service department, conducted independently from sales department is a success. Matters along the lines of the following are thoroughly discussed in this article: Three months free labor; keeping tabs on sold trucks; kind of service for old trucks; advantages derived in servicing these old trucks from the sales angle; simple shop record system; and, service and the saleman.

Dealer Successfully Handles Truck Sales Through a Separate Organization

Aug., 1920; Page, 53

In which is treated a certain dealer's service and sales policies and their advantageous relations to each other. The underlying principles of the system devised by this dealer are by far better than those employed by a large majority of the dealers of today. The reading of this article will disclose many a feature never thought of by the average dealer. Read it. Everything in the nature of service from any angle that you should know is treated in detail. You are certain to get at least one lesson from it. The article is well illustrated with general pictures of the service station and various forms employed in the handling of the business.

Maintaining a Stable Dealer's Representation

Sept., 1920; Page, 58

This article is directed particularly to those embryo dealers who lack knowledge of merchandising, maintaining and servicing motor trucks. In it is also pointed out the need for more preliminary educational work and periodic advice and encouragement among dealers from the manufacturers.

Is Your Rear Axle Weak? Can You Prove It Isn't?

Sept., 1920; Page, 94

A novel table of repair jobs compiled from over 300 different operations is what a Portland dealer uses to tell a prospect just where his truck stands on every unit. In a similar manner lots of other information of a statistical nature can be obtained from repair jobs in the service station for use in connection with sales ammunition. Cultivate the materializing of an idea.

Service Paramount to Sales in Merchandising Pneumatic Truck Tires

Oct., 1920; Page, 52

Story of the growth of a tire dealer, handling everything in tires up to giant pneumatics. How he slowly but surely constructed a dependable and satisfied clientele thorough 100 per cent service and courteous treatment of customers. The fact that this dealer renders real service makes the tire "gyping" bugaboo a thing of no concern to him. He needs no other inducements to create trade. All matters pertaining to the sale and servicing of tires of educational value to those engaged in this line of business, is treated in this article.

Here is a New Plan of Merchandising Trucks

Nov., 1920; Page, 26

Any dealer can do the things which have been responsible for the success of the company mentioned in this article. At least, the proven policies laid down in this article are worth trying. The question of service, the kind expected by every owner, is one of the foremost factors to be considered if success is to be entertained.

A Service Plan That's a Benefit to Both Dealer and Manufacturer

Nov., 1920; Page, 53

An outline of ways and means which will help the dealer to secure more business and to enable the manufacturers to get a better check on his dealers. Among the subjects treated are the following: Lack of factory co-operation; locality of the future truck market; how the dealer is sold by the factory on the value of service and its relation to future sales; value of follow-up letters, of which five are reproduced in the article; and salesman education.

A Service Plan That is Different

Dec., 1920; Page, 55

"Follow through" from the time the truck is received from the factory until it finally reaches the ultimate consumer, is the slogan that made the dealer talked about in this article successful. Closely associated with this plan is proper service and practical associate dealer policy. This article may be briefly outlined as follows: New chassis inspection; selling service to customer; extending credit to the repair shop; stock complete units; selecting the sub-dealer; the sub-dealer must service.

This Kind of Service Doesn't Cost Anything Extra, But is a Great Business Builder

Jan., 1921; Page, 52

Courtesy and a smile also come under the head of service. This article throws a little light on a subject that doesn't generally receive enough consideration. How boosters for a particular make of truck were cultivated. Belief in system but not to such an extent as to kill the value of personal contact. Briefly, the general manager of this concern has studied the human equation, and believes in four cardinal points, namely: Courtesy, promptness, service that satisfies and personal contact with customers and members of the organization. Well illustrated.

Louisiana Firm Finds That a Definite Sales and Service Policy Helps in Merchandising Trucks

Jan., 1921; Page, 89

This article tells of one dealer who discovered that in order to perpetuate a regular flow of business it was imperative to departmentize his business. Not merely separating his business by a dividing partition, but in every respect. This dealer outlined a definite sales and service policy specially adapted for his two lines of business. He attributes much of his success to this departmentizing. Dealers carrying both lines will, by reading this article, learn of many new points that he probably never thought of.

What Appeals Most to the Farmer When Buying a Truck?

Feb., 1921; Page, 20

Is it the price, the service or truck design? This subject is discussed from its various angles in this article. The information contained in it is based on intimate observations obtained by one who has been in continual contact with farmer trade, one who knows. Hence, readers can read this article, satisfied with its authoritativeness, and with the expectancy of learning something which he can later use to good purpose in his relations with farmers.

Proof That the Dealer's Service Station Does Pay

Mar., 1921; Page, 39

Of course, to make it profitable it must be run intelligently. This article tells how. Read how the dealer talked about in this article handles his sales force, which, besides the service question, is treated in a very complete and thorough manner. This article should be of particular use to those dealers who would learn some excellent ideas relative to placing his service department on a sound footing. Reproduced are some of the forms which constitute system.

Capitalizing a Forty Years' Reputation

April, 1921; Page, 40

This is a story of a Maccar dealer in Newark, N. J., who was formerly a wagon builder and experienced no difficulty in upholding the reputation which he has built for himself in the past by extending genuine service and establishing general good-will through honesty and courtesy in all his relations. Service is the foundation of any business that expects to be successful. The human interest appeal of this story will be in accord with better business instincts of all those who may want to read it. Well illustrated with general and detailed illustrations.

This Slogan:

"Get the Truck on the Road"

Is the Keynote of a Successful Philadelphia Dealer's Service Department

Read About This Concern's SIMPLE ACCOUNTING SYSTEM, and Its Method of Handling Stock

By MARTIN J. KOITZSCH

EXPERIENCE is a wonderful teacher. Aggressiveness, organizing ability, efficacious ideas in merchandising and servicing, and the importance of harmonious relations between organization and owner are among some of the most important lessons that had been learned in the hard school of experience, from which graduated the two proprietors of the Philadelphia Day-Elder distributing establishment. Before these two men took over this distributorship five years ago, both, for many years, had been engaged in capacities which brought them into intimate contact with these fundamental requirements, without which no business can long exist.

They are W. A. Manwaring and S. H. Goodman, and what they did in establishing the worthy reputation of the truck in their territory, which covers Southern New Jersey, Eastern Pennsylvania, part of Maryland, and Delaware, is the direct result of constructing a real organization and placing into operation a definite service policy.

Two Prime Factors of Service

Briefly, two prime factors make up the substance of this service policy. First, the carrying of a reasonable stock of parts, and second, the maintaining of an intelligent service department to take care of parts installation.

Prompt service is another point that has been indelibly impressed upon the men. The owner's angle is thoroughly considered in the company's appreciation of the fact that an idle truck means lost money. "Get the Truck on the Road" is the slogan of the shop.

Talk about service and you have struck a cord in the make-up of W. A. Manwaring that will respond immediately. There is nothing general about the definition he advances of the word service. He says: "Service is the rendering of assistance at a time when it is needed, at the least possible cost. Nothing will destroy the reputation of a dealer or mar the prestige of a motor truck as quickly as inability to extend service through the lack of repair parts and inefficient mechanics."

Mechanics Must be Efficient

"We will not tolerate mechanics in our service department who fail to toe the mark," says W. L. Newsom, the service manager. "If, after a certain period, sufficient to have proven his ability, a mechanic is found wanting he is dismissed. Cases such as these are, however, rare. We have had unusual success with our men. This is probably due to the fact that all our men, from the ground up, have learned the business with us, and if the right calibre of man is employed in the beginning—a genuine, conscientious mechanic is assured in the end. They learn and grow with us. They also realize that work handled in a slipshod and slovenly manner won't go. This appreciation not only has the moral effect of causing the men to constantly strive for greater efficiency and co-operation, but has also the important effect of making a satisfied customer, a customer who is confident that the work done on his truck is done right."

Service Station and Offices of Manwaring & Goodman, Distributors of Day-Elder Trucks, 1517-1519 West Dauphin Street, Philadelphia

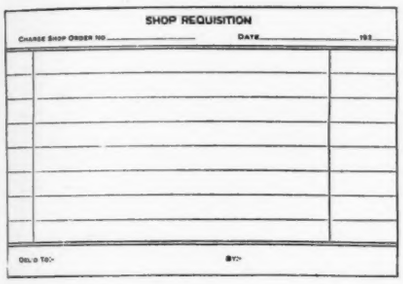
Ready access to the service station is afforded through two large drive-ins. The offices are located in the two-story dwelling shown at the extreme left. Part of the lower floor of this building is devoted to parts storage. Entrance to the storage parts room is through a door inside.

An indication of the utmost willingness of the employes to co-operate with the firm, even to the extent of assuming some of the sacrifice made recently necessary because of a slight secession of business, was evidenced in the fact that they, on their own volition, suggested a cut of five cents an hour, to be supplemented by another cut of like amount thirty days later if business conditions continued poor. Although the later cut was unnecessary, it would have been accepted without a word of remonstrance from not one. This unselfish family spirit and willingness to shoulder in part some of the responsibilities of fluctuating business conditions is attributed to one thing, and that is the friendly spirit of democracy that has been cultivated by the management between the men and officers of the company.

In order to keep pace with the times and keep in touch with new and improved methods of business, to discuss ways and means for making for still better service and to create new business, the company calls semi-monthly get-together dinners. At these meetings all the department heads bring out, suggest and discuss issues that have frequently developed into policies, both of money-saving

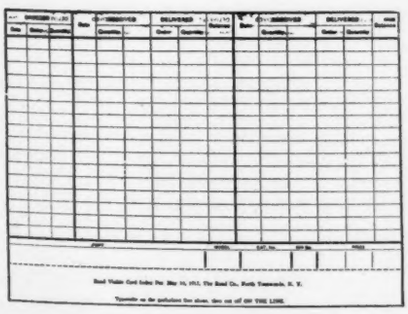
and improved - business - methods value.

Departmentization has been carried throughout the organization. Sales comes under the supervision of R. H. Manwaring, service is handled by W. L. Newsom, the service manager; responsibility for the parts storage rests in the hands of E. K. Lewis, and the trade-in department is supervised by G. Delin. W. L. Newsom attends to all service matters, he is the point of contact between organization and owner. When a truck is driven in the service station for repairs he greets the owner or driver, as the case may be, in a courteous and business-like manner. He endeavors to render the owner all the assistance, in the way of experienced advice, at his command. He recommends repairs wherever his experienced eye tells him attention is needed. In this way the entire truck is checked up and when the job is complete, both the company and owner can feel satisfied that nothing has been neglected and that the repairs have been properly attended to. All repairs are listed on a form, furnished particularly for that purpose, which also serves later as an itemized bill. If the owner desires an estimate of the cost of the job, it is given him, subject to any change which an unforeseen repair may warrant. These approximations have been found very satisfactory.

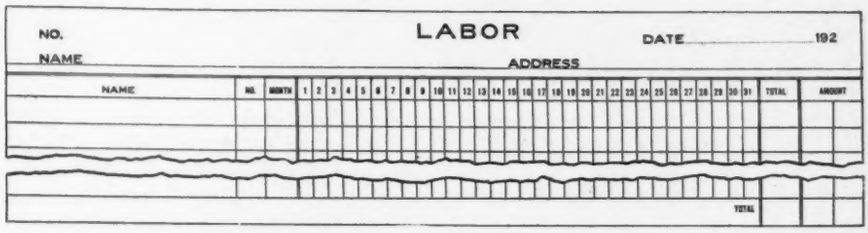


Repairman's Requisition for Obtaining Replacement Parts

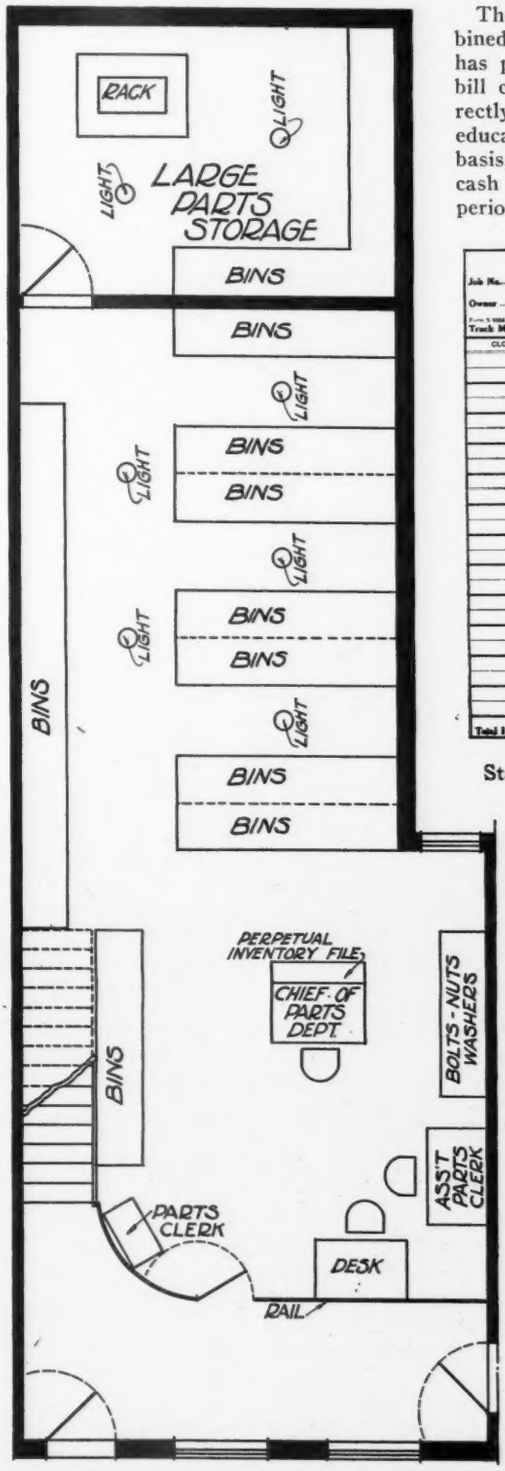
No trouble is ever experienced with the owner because of price, because the cost system is such as to enable the service manager immediately upon completion of a job to tell the customer the cost—and prove it to him.



Whenever Material is Requisitioned a Balance is Struck in the Perpetual Inventory File. Latest Prices Are Also Maintained in This File.

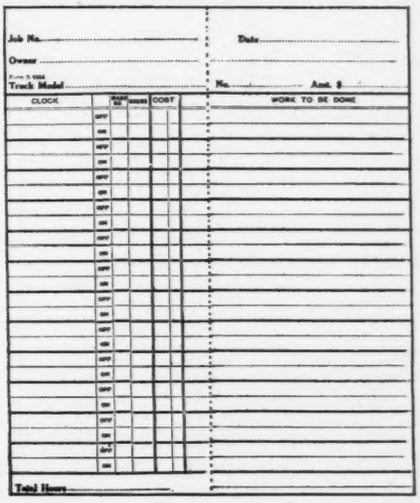


The Labor Sheet, Which is Prepared From Data Contained on the Mechanic Time Cards, Gives in Detail the Complete Labor Cost



Layout of the Parts Storage and Parts Storage Office

The method employed is really a combined bookkeeping and cost system, and has proven very satisfactory in that the bill can be presented promptly and correctly. And as the company is gradually educating their patrons to a strict cash basis, this system enables them to get the cash in quicker. During the booming period not long past the company, as was the case with many other service stations, was more concerned in getting their jobs serviced and on the road as quick as possible, rather than worry excessively about the matter of credit. Times now, however, are different, and the quicker cash is got in and the oftener it is turned, the greater the profit on the investment in replacement parts. Much progress has been made in the cash end of this business, and it is hoped that eventually credit will be entirely eliminated.



Standard Manila-Colored Time Card

The main offices, service station, parts storage, and the re-made truck department, are located in the same building. This building is three stories high and covers a ground area of 90 x 120 ft. and is situated at 1517-1519 W. Dauphin St. An auxiliary building is maintained in West Philadelphia for the temporary storage of re-made Day-Elders taken in as trade-ins. The building is an ample-sized, one-story structure, covering 50 x 200 feet, and is provided with a number of large display windows.

(Continued on page 92)

Are You Supporting Your SERVICE ASSOCIATION?

A Review of the Work Done by the Local and National Associations

By C. P. SHATTUCK

IS the movement to organize the service station managers or heads into Automotive Service Associations growing as rapidly as it should? Nearly three years ago, this month, the initial service association meeting was held in New York City, when Ralph C. Rognon endeavored to put over an organization for better mechanics, which effort resulted in the first Automotive Service Association, that of New York. In October, Newark organized its service managers. Brooklyn, Buffalo and Baltimore followed suit with Syracuse, Hartford, Worcester and Springfield. Omaha organized in 1920, but, although a service association, took on a different name. Indianapolis, Minneapolis, Seattle and Charlotte, N. C., are credited with service associations.

Replies to a questionnaire by the writer show that, with few exceptions, the service managers of the dealers, distributors and factory branches have not given the association support. While in several instances the association has grown to ample proportions and interest is maintained through energetic work on the parts of the live-wire workers, the majority of the organizations state they are experiencing great difficulty in securing attendance at the meetings. Some state that it takes real hard canvassing to obtain members.

From a personal investigation of the membership problem, particularly in the truck field, it would appear that the truck service manager and dealer is not properly sold on the association. Both have the impression that the associations are for passenger car men; in fact, a number of service managers who attended the first meeting or later ones at the request of their employer, or through curiosity, reported that it was all passenger car. As a rule, passenger car men are not interested in trucks, or vice versa, which, in the opinion of the writer, is why the truck men have not supported the association movement. Figures prove the contention. An analysis of the membership, its division, of the various associations replying to the questionnaire, show that 60 per cent are passenger car, 19 truck, 68 accessory or equipment and 35 independent repair shops and garages. An analysis of the subjects, speakers, etc., at the meetings, shows that the greater part are of more interest to the passenger car man than the truck man, although it is admitted that some associations endeavor to arrange for speakers, whose subjects will be equally interesting to both branches.

Dealers Should Take Interest

The service associations are making concerted efforts to obtain the membership of truck service managers. But the failure of the truck men to respond is largely due to the reasons above outlined and to the fact that the average association makes the mistake of trying to sell the service manager only and not his employer. The writer has discussed the service association with a number of truck dealers, some of whose service men are members and more that are not, and it is surprising to note how little the dealers know about the principles of the service association.

The majority view it with suspicion, believing it to be a smooth method of organizing for more money, less hours, etc., a new angle of unionism. When the principles of the association are properly explained the dealer endorses them. The writer suggests that the Membership Committee or those who seek new members among the truck industry will do well to sell the dealer on the advantages of having his service manager represented before selling the latter. There is no real truck dealer today but what he is vitally interested in service, for he realizes its importance with sales—so sell the dealer. It can be done. And no active dealer will refuse to pay the mere pittance of $10 the year dues. If his service head secures one good idea, and he will receive many acquaintances in the association, the dealer is repaid many times for his investment.

If the truck dealer and his service manager are to be interested in the association, the association must see to it that sufficient truck subjects are discussed to keep the new member sold on the organization. The fact that the truck service manager joins and regularly pays his dues will not make the association a success. No association can be a success unless the **members are active members.**

The questionnaire showed that practically every association is not given support by the dealer. Some replies plainly stated that the dealer does not give even his moral support. Some dealers take the attitude that the service managers formed an organization for social purposes. As a matter of fact, Mr. Dealer, the service association was formed for your benefit, to give the public better, cheaper and more satisfactory service than it has enjoyed in the past.

Did you ever stop to consider that the fundamental principle of a service association is to get your service manager

Personnel and Headquarters of Local Associations

	ADDRESS	ORGANIZED	MEETINGS	DUES	PRESIDENT	VICE PRES.	TREAS.	SEC'Y
BALTIMORE	1002 N. Charles St.	Oct. 1920	1st Mon. in Month	$10	Wm. M. Elder	.....	E. L. Baker	A. L. Thomas
BROOKLYN	254 13th St.	April, 1920	2d Mon. in Month	$10	G. T. McFarland	H. L. Bailey	H. J. Wechtel	Fred M. Smith
BUFFALO	207 Sidway Bldg.	April, 1920	Every Other Tues.	$12	E. W. Kimball	Harry Tate	C. C. Proctor	C. C. Proctor
HARTFORD	135 Church St.	March, 1921	2d Tuesday	...	S. A. Foster	J. F. Dunn	G. C. Barnard	J. C. Lavoie
NEWARK	210 Central Ave.	Oct. 1919	2d Thursday	$10	Al Rawson	H. H. Billings	H. L. Wright	F. J. DuMont
NEW YORK	239 West 39th St.	June, 1919	1st. Wednesday	$10	Ralph C. Rognon	Henry M. Holt	F. J. Lowe	Howard Pile
OMAHA	Wilkinson Bldg.	April, 1920	Special	$ 3	Fred A. Lundgren	Geo. W. Cole	J. H. Lionberger	F. L. Snedeker
SPRINGFIELD	11 Park St.	Dec., 1920	2d Tuesday	...	E. W. Darnstadt	N. Miller	H. T. Gates	H. W. Lemay
SYRACUSE	207 University Bldg.	July, 1920	2d Thursday	$10	C. F. West	M. R. Potter	John Sickinger	H. H. Smith
CHARLOTTE	516 Tryon St.	.....	.....	...	.....	.....	.....	S. T. Klingman
SEATTLE	1321 Seneca St.	.....	.....	...	.....	.....	.....	W. A. Simonds

acquainted with the other service managers and to bring about a more human consideration of each other and each other's employer?

Isn't it a fine thing to have your service manager spoken of by your competitor's service head as being a fine chap, instead of the usual knock? Isn't it a fact that if you remove the petty jealousy in service and sales that exists among dealers that you will have accomplished a great deal?

Don't you think that if your service manager visits other service stations, which he will not unless he knows their heads, that he will obtain knowledge that will improve the service you render and reduce costs through being shown short cuts in repair work? There are numerous advantages to be derived by having your service head represented, but he must do more, he **must attend the meetings.** And the member must be loyal to his association. If he obtains any good from it he should be a booster for it, and when opportunity is afforded put in a good word for the association to his employer. Not so long ago I heard a service manager of a big distributor inform his employer when asked about the association "that he guessed it was all right, but he didn't get much out of it." It took the writer about ten minutes to prove to that dealer that his man did derive benefits. That service man was not knocking the association intentionally, but it was a knock. Any dealer wants some reason for the expenditure of even $10 a year.

The questionnaire resulted in a universal reply as to the type of speaker desired by the associations at their meetings. One and all want the head factory service executive. Whether the members wish to come to close grips with him or desire to get better acquainted is problematical. Practically every reply on the question of speakers also suggested that the factory, car, truck, parts, units, etc., send capable speakers with illustrations to explain how to service the product, the factory methods, tools, etc. This endorses the factory service articles on units, etc., that have been appearing in The Commercial Car Journal for over two years.

A number of replies stated that it would be highly desirable if the dealers would join as proprietory members. In some associations there are many dealers. Too many, however, believe if they send their service head they have done their duty. The writer suggests the holding of a special meeting or giving over a regular one to a dealer night, and getting the dealers out to hear some pertinent facts of the relation of service to sales in 1921 and thereafter. It would also be a good plan to invite the sales manager, for it might be that the service heads could impart some valuable information on how salesmen juggle service.

With one exception the replies endorsed the annual service convention of the associations, such as was held under the auspices of the New York organization during the New York Show in January this year. Among the questions asked in the questionnaire was how the trade papers could aid the associations. There were two general replies. One was to educate the factory, dealer and distributor to the value of an association and the writer has attempted to do this in this article. The second request was that more space be given the activities of the associations. The Commercial Car Journal offers its columns to the various service associations and will gladly publish the news of their activities, provided the secretary will forward same to the editor.

At the present time of writing efforts are under way to form service associations in twelve cities not previously mentioned. Any service association in the larger cities will gladly supply information, such as by-laws and constitution, etc., and will send speakers to those desiring to start an association. New York and Brooklyn, and Newark, have been active in this respect and a number of new associations in the East are due to their co-operation. It is not difficult to form a new organization, but some one MUST START THE BALL ROLLING. Get two or three of the service managers together at lunch some noon and talk it over. Write the New York, Brooklyn or Newark associations for information and how to organize. They will send speakers to explain the benefits of an association. The National Automobile Chamber of Commerce, New York City, has a service committee and its secretary, Harry Cobleigh, will lend a hand.

(*Continued on page 90*)

A Few of Those Who Are Working Hard to Make Their Service Associations a Success

Ralph C. Rognon
President New York A. S. A.

Al. Rawson
President Newark A. S. A.

Howard Pile
Secretary New York A. S. A.

Carlton C. Proctor
Treasurer Buffalo A. S. A.

Fred. M. Smith
Secretary Brooklyn A. S. A.

G. T. McFarland
President Brooklyn A. S. A.

Wm. M. Elder
President Baltimore A. S. A.

Truck Manufacturers Condemn Factory to Consumer Merchandising Methods

Manufacturers Realize That Direct-to-Consumer Method is Detrimental to Best Interests of Dealer, and That Service Cannot be Rendered Adequately on Vehicles Sold Under This Plan. Pass Resolution Condemning Any Plan Which Does Not Carry With It Satisfactory Service Arrangements

(Special Correspondence)

DETROIT, June 7th.—That the dealer must be given a square deal and that the dealer cannot be expected to render service on trucks which are not sold through his organization was the concensus of opinion of the meeting of sales managers, who convened today at the headquarters of the National Association of Motor Truck Sales Managers.

At this meeting, which was the regular monthly meeting of this association, the plan and campaign recently announced by a certain motor truck manufacturer on selling motor trucks to fleet owners direct by mail and at reduced factory prices, was discussed. It was the sense of the meeting that, although this plan might have passing merit or offer temporary relief as a means of unloading stock or for the purpose of obtaining a list of paper prospects, such plans are detrimental to the industry at large. Furthermore, the direct selling plan, as carried on by the company under discussion, eliminates the dealer entirely from the transaction, and deprives him from that legitimate business in his territory to which he is certainly entitled.

The general outlook on the industry was also thoroughly discussed and the opinions and suggestions made by those who spoke indicated that the manufacturers are making greater efforts than ever to assist the dealer in every way possible. Many manufacturers are now working on plans which will be instrumental in helping dealers overcome present difficulties.

That the manufacturers are fully agreed upon the disadvantages of the direct-to-consumer mail-order plan is fully exemplified by many letters received by this publication as a result of a canvass made to ascertain the manufacturers' opinions on this subject. The thoughts expressed by the various manufacturers are here given in the form of extracts taken from these letters:

Buyers are investigating the quality of the truck as well as the financial standing of the factory back of it, and the financial condition of the dealer representing it.

It is a difficult matter to formulate a plan for stopping the practice of manufacturers selling a truck to a user at a discount. Possibly it would be done if all dealers would refuse to service trucks bought that way. All manufacturers, including ourselves, are anxious to sell trucks wherever they can, but it has been several years since we attempted to sell motor trucks outside of our dealers' territory. To fight for that business is a very expensive proposition. The manufacturer runs the hazard of having dissatisfied customers, because there is no dealer to render service on the truck they buy. They forget that they bought the truck at a discount when they have trouble with it. For that reason we have not offered for sale any trucks outside of our dealers' territory, at anything other than list. The motor truck industry would be much better off if all manufacturers would do the same.

It would seem to us that a plan of this kind could only be attempted with the thought of liquidating some inventory and not with the idea of building up a strong, substantial organization.

Irregardless of how well prepared a manufacturer should be to render proper service, or how able he is to co-operate with his consumers, he cannot hope to render the proper kind of attention to individual buyers except through high-class, responsible dealers, and it certainly is not fair to these dealers to under sell them direct from the factory. It also seems to us that this method would serve to destroy confidence in the motor truck industry were it continued for any length of period.

It has long since been proved through costly experience to those who have tried it, that nothing which requires servicing, can be successfully sold by mail, and if ever there was an industry that required the service of a dealer, it is the motor truck industry.

RESOLUTION

Adopted at a meeting of the National Association of Motor Truck Sales Managers, Detroit, June 7th.

RESOLVED, that whereas certain procedure has consistently promoted the best interests of manufacturers, dealers and truck users in the furtherance of sales and operation, and,

WHEREAS, certain sales policies have shown definite and tangible benefits to the motor truck industry as a whole, and,

WHEREAS, this Association has endorsed and is fostering this procedure and these policies, it is

RESOLVED, that it will not endorse or approve any sales and service plans which will take from motor truck dealers the legitimate profits to which they are entitled, realizing that such methods will ultimately be to the detriment of the consumer, insomuch as it will seriously affect the proper servicing of trucks, and be it further

RESOLVED, that it will lend its aid and support to motor truck dealers in their efforts to give truck users prompt and efficient service, which type of service is only possible through direct contact between consumer and dealer in the locality in which such trucks are used, and be it further

RESOLVED, that it shall use its influence to discourage the "factory to consumer" method of merchandizing in the belief that such a plan is impractical for the reason that satisfactory service cannot be rendered and as a consequence the motor truck industry will be injured and the interests of both dealer and consumer will suffer.

Selling trucks by mail is so far fetched and so complicated that those who have tried it gave it up as a bad job—truck selling represents 90 per cent service and 10 per cent truck—granting, of course, that the construction is right and the company back of it is sound and will carry out their purposes.

Trucks sold via the mail route will sooner or later become "orphans" on the market, resulting in dissatisfied owners, and means that those who, at this late day are attempting it, have in mind only one thought and that is to unload their surplus stock and sooner or later, if they do survive, they must start all over again to build a dealers' organization.

Those who have tried to handle their business in this way have absolutely fallen down, as when a man buys a truck it does not make any difference whether it is a one-ton truck or a five-ton truck, it means an outlay of a lot of money. When a man is spending from $2000 to $6000 for one thing he wants to think over the proposition very thoroughly. He wants to get the consensus of opinion from his friends as well as from some expert who knows something about the proposition he is going to purchase.

In buying a motor truck the far-seeing and sensible purchaser realizes that he must get service. He cannot get satisfactory service if he buys direct from the factory, and he can get satisfactory service if he buys through a good, responsible dealer.

We cannot see where it would benefit either the dealer or the manufacturer to sell merchandise direct. This not only holds true with the truck manufacturer but with every other merchandise today. The best way to do business in the truck manufacturing business is, and no doubt always will be, through the local dealers. We believe in the local dealer, not only because of the prestige he has in his community but because of the moral effect when the merchandise is purchased direct from the manufacturer.

In short, I believe the consensus of opinion of most motor truck manufacturers is that the mail-order selling idea is entirely foreign to ethical motor truck merchandising.

The life-blood of any motor truck manufacturer is the dealership organization and if we cannot co-operate with our distributors and dealers to the fullest extent and protect them in every way possible, our business will be short-lived.

To us it seems as though agency sales are the true answer, not only for trucks, but for automobiles of any description. It has been the writer's experience, extending over many years' of manufacturing and merchandising, that by no other means can the maker be kept in such close touch with the buyer. In no other way can the latter receive the same measure of attention and satisfaction in case of urgency. It has been tried over and over again, and while there have been sporadic cases that have proven successful, they have been the exceptions that have proven the rule. For our part, we expect to rely upon the agent, and to knit him to us as closely as possible.

I think you will find, upon investigation, that the trucks which are being offered in that way are local trucks to a large extent, or trucks which, up to this time, have been unable to establish any standing in the trade. As old merchandisers and builders we, of course, decidedly disapprove of such a situation and regret that it exists, but feel sure that the ones making the attempt to dispose of their surplus goods in that way will never be successful.

The success of any automobile or motor truck organization in the future will be only as great as the success of their dealer organization, and any move that is made which will destroy the confidence or standing of the dealer, will in itself destroy the success of the manufacturer.

We have had experience with this proposition and found it to be unproductive. We went on the principle that a low price on a truck using standard units, now supposed to be well known, would attract the buyers, but we found that the price was of secondary consideration in the purchase of a truck. In that regard it is different from any other line.

We now believe in a good, energetic agency organization, and feel that we must be loyal to our agents and stand behind them in every way possible.

EDITORIALS

Price Reductions Should be Announced Promptly

A FEW manufacturers have announced a price cut within the past six weeks, while quite a few are about ready to make their announcements. In fact, some have been considering price reductions for some time, but have been holding off waiting to see what the other fellow would do. This policy of holding off is not to be recommended.

The public in general is looking for lower prices in all commodities. Although we grant that motor truck prices have not been raised in conformity to other stable products during the war period, the public has not been educated to that fact. The truck buyer is looking for lower prices; in fact, he has been educated by the truck merchant to expect lower prices simply because many dealers disregard the makers' list price anyway. Trucks are being sold these days with lots of shading of the list price.

If the manufacturers, who see fit to cut prices, would do so immediately, so much sooner would the truck buyer and the dealer know where they stand. The public is expecting lower prices in everything—trucks are no exception. Some makers contend that they cannot afford to reduce prices—all well and good; but tell the public about it and stick to your word. Don't keep the prospect in a doubtful frame of mind. If you are going to cut, do the job right. Cut off a slice that's worth while, and then sell your product at the new price and nothing less. It will help stabilize the industry and beget confidence.

The Engineer Can be of Great Help

WHEN we talk of service, we usually forget the engineer; although the mechanic, who is forced to unravel some of the mysteries which the engineer has developed on the designing board, usually has a good many things to say about the engineer. Some units, which seem to function well from the designing-board point of view, give trouble when they reach the service station, or when they are due for an overhauling or for adjustment.

In the service station and the repair shop, the engineer can get much of that practical education, which cannot be obtained in any other way. In this connection, the old adage that "the proof of the pudding is in the eating" is very apropos. Many units and parts of a truck are designed to meet certain requirements, but under actual usage they do not adequately meet those requirements. Therefore, in order that the engineer may know more about the real service, which the parts he has designed are giving, he should spend as much time in the service stations of the dealers of his factory as he can possibly spare. The organization, which is willing to receive the suggestions of its dealers and service station heads, will unquestionably make the most progress in the direction of eliminating loss of time and frequent replacement of parts. In many instances, the engineer could devise ways and means for shortening the time required to overhaul a certain part by actually watching the operation as performed by the service station mechanic.

But the engineer cannot be expected to carry the burden alone. He must have the co-operation of the sales, service, manufacturing and accounting departments in order that the advantages to be derived by his efforts may be fully realized. Periodical visits to the service stations will give the engineer an idea as to how his trucks or certain units are wearing, and it will give him more real knowledge as to what motor trucks have to do and how the user handles them than is possible through any other method.

Secretary Hoover Needs Assistance

IT is Secretary Hoover's great desire to have the Department of Commerce function as a real business organization. One of the big jobs this department is now tackling is the gathering of production data and sales statistics, which are to be published promptly for the benefit of all business.

This is a move in the right direction and should be of inestimable value to the business men of this country. Although one of the chief functions of the department is to gather general statistics, these are not of any direct or immediate benefit to any business as they are usually months old before they are put into the hands of the public.

Under the new order of things, this department will be of great help in stabilizing business. This department, however, cannot keep up this work, unless Congressmen are shown the need for such figures. The automotive industry should do its part in urging the appropriation of sufficient money to carry on this work in the Department of Commerce to the fullest extent.

News of the Trade in Brief

(For Factory Items, Personals, New Incorporations, Etc., See Pages 96-97)

Illinois Has Sensible Manner of Preparing Automobile Laws

Much motor legislation has been enacted lately by legislative bodies possessing only a scant knowledge of motor vehicle conditions. To arrive at a sensible and fairly accurate solution of the licensing problems, the State of Illinois intends to conduct a series of experiments on a special highway.

The State Highway Department has under construction an experimental road, containing 64 test sections, each section differing from the others in design. The types of pavements used include macadam base with asphalt surface, macadam with brick top, concrete base with brick and asphalt top and regular concrete roads, both plain and reinforced.

The trials on these roads, which will take place in the fall, will consist of a passage of trucks over the road, first carrying light loads and then gradually increasing the loads. Equipment of all kinds will be used in these tests. Careful records will be made, then analyzed by expert highway engineers of Illinois Highway Department, and bulletins issued.

Warehouse Traffic Men to Convene

Traffic representatives of manufacturing companies which distribute their products through public merchandise warehouses will meet in convention at the William Penn Hotel, Pittsburgh, on June 16 and 17.

The convention will be held under the auspices of the Shippers' Warehousing and Distributing Association, which was organized at Chicago a year ago for the general purpose of effecting standardization and simplification of forms, documents, practices, rules and regulations in the business relationship between the manufacturers and the public warehouse industry.

Uniformity, overages and shortages, taxation on stocks in warehouses, methods of billing, systems of reporting of stocks—these will be some of the general subjects which will be discussed at the Pittsburgh convention. Solution of the various problems with which shippers are confronted in distributing products from factory through the public warehouse to retailer and consumer will work toward cutting down the costs of distributing.

Manufacturing companies which route goods through warehouses are eligible to membership in the Shippers' Warehousing & Distributing Association, and their representatives will be welcomed at the Pittsburgh convention, regardless of whether they join the organization. Details regarding the convention may be obtained by addressing the secretary, Kent B. Stiles, 239 W. 39th St., New York City.

Horse Market Reaches Lowest Figures of the Season

A Chicago financial expert attributes the recent low drop in the price of horses in the western market to the supplanting of the big horse by the motor truck. On May 26 the Chicago horse market reached its lowest figures of the season; it was said to have never been so dull. Commission men express little optimism regarding summer business.

Coming Events

SHOWS

September, 1921—Sacramento, Cal. Seventh Annual Show during State Fair. Automobile Tent (30,000 sq. ft.). Passenger Cars, Trucks, Tractors, Accessories and Agricultural Implements. State Agricultural Society, Sacramento.

September 28 to October 8, 1921—New York City. Electrical Exposition, at 71st Regt. Armory, Park Ave. & 34th St. Exhibit will include electric vehicles. Address Norman Maul, 130 East 15th St., New York City.

CONVENTIONS

Boston, Mass., September or October, 1921—Tenth Annual Congress of the National Safety Council.

Chicago, Ill., July 30 to August 14, 1921—Pageant of Progress Exposition, Automotive Division, Municipal Pier, Address Henry J. Kramer, 507 City Hall, Chicago.

Chicago, Ill., October 12 to 14, 1921—Annual Convention of the National Implement and Vehicle Association. H. J. Samiet, Sec'y, 72 West Adams St.

Chicago, Ill, November 14 to 19, 1921—Annual Convention and Business Exhibit of the Automotive Equipment Association at the Coliseum.

Elkins, W. Va., November 8, 1921. Semi-Annual Meeting of the West Virginia Automobile Dealers' Association.

Greenville, S. C., July 11, 1921—Semi-Annual Meeting. South Carolina Automotive Trade Association.

Mackinac Island, Mich., July 4 to 9, 1921—Summer Meeting of the Automotive Equipment Association. Address, 1813 City Hall Square Bldg., Chicago, Ill.

Milwaukee, Wis., June 30 to July 2, 1921—Annual Convention of the National Association of Commercial Haulers. C. R. Collins, Gen. Mgr., 1851 Broadway, New York.

Philadelphia, Pa., June 15, 1921 — Annual Outing of the Motor Truck Association of Philadelphia, at the Lu Lu Country Club.

Pittsburgh, Pa., June 16 to 17, 1921—Convention of the Shippers Warehousing and Distributing Association. William Penn Hotel, Pittsburgh.

Santa Barbara, Cal., June, 1921—General Meeting of the California Automobile Trade Association. Robert W. Martland, Pacific Bldg., Oakland, Cal.

FOREIGN EVENTS

Bandoeng, Java, Dutch East Indies, September, 1921—Second Industrial Fair. Automobiles and Trucks. Netherlands-India Industrial Fair Association.

Brussels, Belgium, December 3 to 15, 1921—Annual Belgian Automobile Show.

London, England, October 13 to 23, 1921—Olympic Commercial Car Show.

London, England, November 4 to 12, 1921—Olympia and White City, Fifteenth International Motor Exhibition. Apply to exhibition manager, Society of Motor Manufacturers and Traders (Ltd.), 83 Pall Mall, London, S. W. 1.

Paris, France, October 5 to 16, 1921—Automobile Show. Grand Palais.

Utrecht, Holland, September 6 to 16, 1921—International Industrial Fair. American Representatives: The New York Chamber of Commerce for the Netherlands and the Netherlands East and West Indies, Inc., 44 Beaver St., New York.

Warns Industry Against Tire Dumping

Inquiry has shown that automobile and truck manufacturers, as well as tire manufacturers, are keenly interested in the manner in which thousands of automobile and truck tires, sold to the Government, and now being shipped back to this country from France, are sold to the public. Much interest has been aroused through the issuance of a bulletin by the National Vigilance Committee of the Associated Advertising Clubs, directing attention to the fact that some of these tires, long exposed to the elements, have been described in advertisements as being of "first quality" when in reality they have been exposed to the elements for months.

"The National Vigilance Committee is not opposed to the resale of these tires from France," says Richard H. Lee, counsel for the advertising clubs. "We do insist, however, that they be sold for what they are.

Ford Again Cuts Price

The Ford Motor Co. again announces a reduction in the price of all its products except the Fordson tractor, effective June 7. The truck chassis, of 1-ton capacity, has reduced $50, making the present price $495. This is the sixth price change since 1914.

In commenting on the price cut, the company says, "The big reductions last fall were made in anticipation of low material costs, which we are now getting the benefit of, and this fact, together with increased manufacturing efficiency and unprecedented demand for models.

"During May we produced 101,424 Ford cars and trucks for sale in the United States alone, the biggest month in the history of our company, and our factories and assembly plants are now working on a 4000-car daily schedule for June."

Trucks Carried Half as Much Freight as Was Carried by Rail in 1920

During 1920 motor trucks in the United States hauled 1,200,000,000 tons of freight, or nearly half the amount carried by rail lines, which totaled 2,504,000,000 tons, according to a compilation made by the National Automobile Chamber of Commerce.

The growth of the automobile business has not been competitive with the railroads, however. Much of it is directly tributary, as in bringing both passengers and freight from farm to train, and in suburban service to cities. Another field for highways transport when not directly tributary to railroad is travel from point to point over short haul distances where there is no other means of communication.

Timken Parts Service to Truck Dealers

At a meeting between Timken-Detroit Axle Co. officials and officers of several of the motor truck companies which use large quantities of Timken products each year, held at Detroit, May 11, a decision was reached on the distribution of Timken service parts, which will doubtless have a considerable effect in solving this question for other concerns, although the present plan considers only the companies involved.

As a result of the conference the motor truck manufacturers will get together and prepare what they consider a fair method of service parts distribution through their own organizations, this plan to include a downward revision of price schedules, which will make it possible to service assembled motor trucks at a cost that is fair to customer and to dealer and distributor. It is likely that in smaller communities, where business will not justify the carrying of a large supply of service parts by any one dealer, several dealers will combine in carrying one stock sufficient to meet all needs. A final decision on this system will be made at some future meeting. At the session held in Detroit a committee was appointed among the truck manufacturers, consisting of Messrs. Allen H. Zacharias, of the Garford Motor Truck Co., chairman; Moie Cook, of Service Motor Truck Co.; S. A. Cook, of Diamond T Motor Car Co.; M. L. Pulcher, of Federal Motor Truck Co., and S. P. Gould, of Selden Truck Corp.

First Meeting of Dealers and Manufacturers Opens Way for Great Improvement in the Industry

For the first time in the history of the automobile industry, committees officially representing the organized manufacturers and the organized dealers have met in conference to discuss ways and means for bettering the industry through the cooperation of the two great divisions most deeply concerned with its success.

At Detroit on May 9 these committees held an all day session at the Detroit Athletic Club, and although no decision was even attempted in the points discussed, such favorable progress was made that another meeting will be held in June and in all probability future meetings will take place thereafter monthly.

The utmost friendliness was demonstrated on both sides. The time has come when both manufacturers and dealers of the better type realize the mutuality of their interests, and that each group is earnestly and sincerely working to smooth out whatever differences may have arisen during the seething years of the immediate past is evidenced in the manner in which all subjects at issue were discussed.

The meeting was presided over by W. C. Sills, general sales manager of the Chevrolet Motor Co., who represented the National Automobile Chamber of Commerce in the meeting. H. B. Harper, Overland distributor at Philadelphia and a past president of the National Automobile Dealers' Association, acted as secretary. Representing the 125 car and truck manufacturers in the chamber were, in addition to Mr. Sills, Messrs. C. B. Voorhis, Nash Motor Co.; Hal T. Boulden, Selden Truck Corp.; F. E. Connor, Chandler Motor Car Co., and Alfred Reeves, manager N. A. C. C.

The N. A. D. A. representatives were: Jesse A. Smith, Milwaukee (Hudson-Essex); H. B. Harper, Philadelphia (Overland); F. W. A. Vesper, St. Louis (Buick); A. J. Shorey, Boston (Velie); N. H. Cartinhour, Indianapolis (Federal Truck); Harry G. Moock, general manager, and C. A. Vane, general council, N. A. D. A.

As a result of the meeting a definite program was outlined as to contract forms that would give the dealer business stability in his community, and it is understood that some very definite recommendations on this subject may be expected at one of the early future meetings.

Discounts were taboo, inasmuch as there seemed to be no conclusive agreement on this subject even among the dealers present.

The statement given out at the conclusion of the meeting was as follows:

With a view to further co-operation in solving present problems in the automobile industry, representatives of the National Automobile Chamber of Commerce and the National Automobile Dealers' Association held an all day session at the Detroit Athletic Club yesterday and considered such items as yearly contracts, used cars, parts, stocks, advertising and service to the public.

Contracts were considered from the viewpoint of clauses that would strengthen the dealer with his banker and his customer. On the problem of used cars it was agreed that a general investigation should be made into the used car situation by the national organizations.

Sectional advertising for the benefit of the dealers, a closer and more frequent survey of parts, stocks, and a broadening of service plans for all users of cars and trucks were deemed necessary for the dealer's success.

These suggestions with additional information to be obtained, after consideration by manufacturers and dealers, will be the subject of another meeting of the committees to be held in Detroit next month.

Goethals & Co. No Longer Connected With Pierce-Arrow

The Pierce-Arrow Motor Car Company's working agreement with George W. Goethals & Co., Inc., has been terminated. George W. Mixter has severed his connection with the Goethals Company to continue as president of Pierce-Arrow. Goethals & Co. was employed to assist in bringing the Pierce-Arrow plant back to a peace basis and to revise its line of cars and trucks. This work, it is stated, has been accomplished, with the new line of cars placed in production.

New Rates on Rubber Freight

The new freight classification on shipments of rubber and rubber goods went into effect May 25. The rates are contained in Supplement No. 2 to Consolidated Freight Classification and are as follows:

Artificial Leather or Auto Top Material.—Second class rates on shipments in any quantity have heretofore applied to Southern points, but, effective May 25, rating will be fourth class in carloads.

Crude Rubber.—Shipments of crude rubber to points in the South have been rated third class in any quantity. This rating has been changed to second class less carloads and fourth class in carloads.

Pneumatic Tire Valves.—This article has been rated at first class in any quantity in all territories. Carload rating of third class with a minimum carload weight of 40,000 pounds has been established to points in official and Western classification territories. The rating under the Southern classification is unchanged.

Pneumatic Tires Less Than Carloads in Wire Bound Bundles.—First class rating has been established on pneumatic tires, less than carloads, in wire bound bundles to and between points in the South instead of one and one-half times first class rates.

New Moline Engine Company to Organize Soon

EAST MOLINE, ILL.—Formal organization of the Moline Engine Co., which will manufacture Knight motors for the R. & V. Motor Company, in addition to its established business of the production of poppet-valve engines, is expected soon. All capital stock will be held by the Root & Van Dervoort Engineering Company, which then become merely a holding concern. The automobile business has already been separated and organized as the R. & V. Motor Company.

The Moline Engine, it is announced, will expand its business and expects to have an annual production valued at approximately $15,000,000.

This will not curtail the R. & V. plant activities, but result in centralization of the two units, into which the main organization has been divided. Rumors of the control of the engine division of the plant by the Continental Motors Corporation are denied by company officials in connection with this change.

Directors of the three R. & V. industrial corporations recently elected have chosen the following officers: President, H. A. Holder; vice-president, G. A. Shallberg; secretary-treasurer, S. G. Smith; assistant secretary-treasurer, G. L. Walker. C. H. Van Dervoort was elected a vice-president of the motor company and will have charge of the sales. In addition to these officers the directors include O. J. Root, Rufus Walker, Jr., R. S. Hawes, J. W. Reinholdt, S. A. Mitchell and D. W. Gurnett.

(News of the Trade is continued on page 87)

S.A.E. Engineers See Need for Intensive Research and Education

Mid-Summer Meeting at West Baden Well Attended. Good Attendance at Various Sessions Despite the Heat. Bachman Becomes President

ONCE again members with their wives and guests gathered for the annual summer meeting of the S. A. E.—this time at West Baden. This little town is located in the southern part of Indiana, about 105 miles south of Indianapolis. West Baden and French Lick are adjacent. In fact the taxis were kept busy transporting the visitors back and forth between these famous resorts, especially during the afternoon and evening hours, when business of the society was abandoned. Sessions were only held during the morning hours, while the afternoons were given over to a well-arranged sports program.

Those who attended the meeting will agree that the first few days were real hot ones, especially out-doors. But old Jupiter Pluvius came to the rescue occasionally and dampened the atmosphere and also gave those who had charge of the outdoor sports a merry time postponing the events until such time as would give the entrants an opportunity to show their skill without getting drenched.

The field sports did not reach the batting average of last year because of the wet condition of the ground. But all the events were run off, even though there were fewer contestants. An unusually select list of prizes was awarded. Swimming was out of the question this year, as no suitable place for holding aquatic sports was available. If the pool connected with the hotel had been in commission we doubt if the engineers would have paid as much interest to papers on flame propagation and others dealing with heat elements as they would have to a cool swimming pool.

About seven hundred members with their wives and guests attended the convention, which number nearly reached the figure of last year. This year's attendance was much greater than anticipated.

The sessions were devoted mostly to subjects of a technical nature and did not take into consideration many problems dealing with the business side of the automotive industry. Such subjects as turbulence, handled by Harry Horning, and fuel economy, by W. S. James, produced the most interest from a strictly professional standpoint, and showed that since the need for more economical operation has been expressed by the motoring public that the engineers are fully aware of the changing conditions. Undoubtedly great advances in fuel economy can be expected in the near future. The engineers are fully awake to the greater economic period which lies before them and also fully realize the need for closer cooperation between their profession and the sales end.

The Standards Committee passed practically all the standards placed before the meeting with the exception of standards affecting studs and the report on battery ratings for isolated electric lighting plants.

The Highway Transport session brought out a paper by A. T. Goldbeck, of the Bureau of Public Roads, in which he brought out the point that the cost of road construction and maintenance is entirely too high and that roads must be built that will stand up longer than a year or two. A point which he stressed in his paper is that the vehicle and the road must be better suited to each other, that at the present highway construction and vehicle construction are not closely related to each other. Although Mr. Goldbeck does not wish to go on record as actually favoring the multiple-wheel vehicle, he feels that this construction should be given careful consideration as a means of increasing the life of the road, at the same time permitting increased carrying capacity.

President Beecroft, in his address, pointed out the necessity for educational work and the need for intensive research. Foreign trade, he said, "while directly a merchandising activity, has a very direct connection with engineering and its future will be to no small extent dependent upon the knowledge the engineer has upon the conditions and the characteristics of the people in the countries in which his product must perform."

In connection with transportation he urged equitable distribution of the burden among the rail, the highway and the air, and that the engineer must do his part to secure the most efficient use of transportation in all branches.

B. B. Bachman, chief engineer of the Autocar Co., was honored with the nomination of president. Although a young man, he has shown exceptional ability, especially in connection with the standards work of the society. His past record speaks for itself. The other nominees for the various offices are as follows: First vice-president, J. V. Whitbeck; second vice-presidents, Motor Car Engineering, F. E. Watts; Marine Engineering, O. W. Young; Aviation, V. E. Clark; treasurer, C. B. Whittelsey; councilors, two-year term, Lon R. Smith, C. F. Scott, H. M. Crane; councilor, one-year term, W. R. Strickland.

The treasurer's report shows that the society is in fine shape financially, the net assets being nearly $130,000.

The membership now totals 5,468, of which 51 per cent are active members. Detroit leads with 325 members to its credit. The Meetings Committee, C. F. Scott, chairman, reported that in October the society plans to gather with the American Society of Mechanical Engineers, at the Aberdeen proving grounds, at the invitation of the U. S. Ordnance Department. The date of the mid-winter meeting will be decided later. Extension meetings are also contemplated in such localities where no regular sections exist.

GET THIS!

Over 1,200,000,000 tons of freight were carried by motor truck from June 1st 1920 to June 1st 1921, which is more than the tonnage records of the inland waterways and the interurban trolley lines

Luverne Changes Name

The Luverne Fire Apparatus Co. is the new name adopted by the manufacturers of Luverne fire trucks.

The original concern, the Luverne Motor Truck Company, will continue the manufacture of commercial trucks, while the new concern will specialize on fire trucks and fire apparatus equipment of all kinds.

The same financial interests are back of both concerns, and the only object in separating them is for the purpose of preparing for enlarging the facilities for handling fire apparatus business to meet the heavy increase in demand.

The Best, Cheapest and Quickest Method of Rendering Truck Spring Service

What is the Best and Cheapest Service to Your Customers When a Spring Breaks, Mr. Truck Dealer. Replace the Broken Leaf or Leaves With New Ones, Have the Blacksmith Make Repairs or Follow the Advice Given by Standard Spring Makers?

By C. P. SHATTUCK

THEORETICALLY, if a spring were constructed with all leaves of exactly the same metal, each plate tempered and finished alike, each leaf would attain the fatigue limit at the same time. In practice, however, one or more plates reach the fatigue limit earlier than the others, and the breakage that results may be due to a number of factors, such as abnormal stresses, leaves not properly tempered, use of a new leaf with old plates, etc.

When a plate breaks the others are subjected to an overload or stress because the number of plates is reduced. If the truck is being grossly overloaded, and the springs are old, the factor of safety incorporated in the design by the spring manufacturer is reduced. In other words, when a plate breaks the others not only must carry their load but that of the broken leaf. The replacement of a broken leaf with one not properly tempered, not capable of functioning as it should, localizes stresses at certain points.

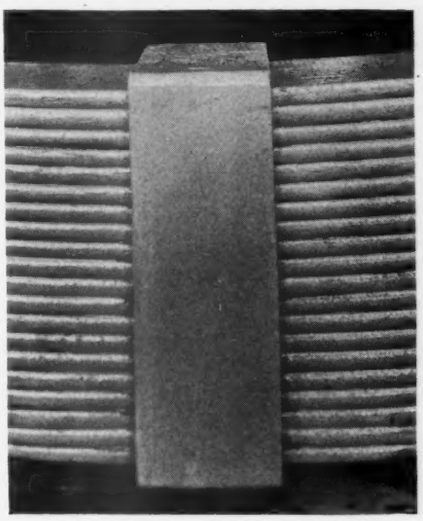
Correct Broken Springs Immediately

If a broken leaf is not replaced with the proper plate, if allowed to remain for any great length of time, its edges at the fracture will have the same effect on the adjacent or contacting plates as would deeply indenting the metal with a dull cold chisel. This is in effect the method employed by the blacksmith when he desires to cut or break a strip of cold metal.

Truck springs do break. The spring manufacturer states he can construct a spring that will outlive the truck provided he knows the factor of safety. Springs are designed with a factor of safety and to care for a reasonable overload, but with the tendency of the owner or driver to carry loads on the truck equal to and beyond the safety point, to distribute unequally the load and travel over rough roads, the fatigue point is more quickly reached than under normal conditions.

There is no denying the fact that the practice of loading the truck until its body almost contacts with the tire, an abnormal deflection, is the greatest factor making for fatigue and breakage. It is held by some spring engineers that short springs, 50 in. and under for example, invite greater opportunity for fatigue and breakage with overloading than do the longer springs which are said to be coming into more general use. The longer springs, ranging from 54 to 58 in., are straighter, make for greater deflection, and their advocates say that the design will be a step towards curing the overloading evil.

Fractures also occur in the spring eyes of the main plate and are most often caused by seizure at the eye itself, although it also may be due to a tight bolt or from the shackles being too tight on the sides of the eyes. This seizure or binding at the eye when the spring is flexed localizes the stresses in the eye, resulting in a fracture. The eye is a vital point of the spring and the best practice requires a diameter providing a factor of safety involving also the factors of the thickness of the main plate, width and their relation to deflection.



(E) The Banded Spring Favored With Hotchkiss Drive and Employed by Several Well-Known Truck Manufacturers.

Breakage Not Always Attributable to Fatigue

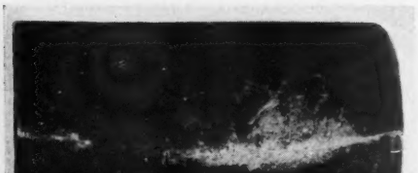
While breakage of a plate may be due to fatigue it is often caused by a poor leaf, one not properly tempered. The permanent set of a spring is generally due to improper heat treatment. This brings up the question of what is the best and cheapest service to the truck owner when a leaf breaks. According to the spring manufacturer the best and ultimate cheapest service is a new spring. Figured on the dollar and cent basis the new spring will, eventually, be less expensive to the owner in the long run, when the cost of the labor of removing, disassembling, inserting new plates, reassembling and replacing is taken into consideration. Add to the cost that of idle time of the truck while the repairs are being made, the expense will generally be found to be considerable. And if the new leaf be made by a blacksmith not equipped to properly heat treat the leaf, and who does not use a high-grade alloy steel, there is a possibility that the adjoining plates may break. It is not an infrequent occurrence for a repaired spring to be returned to the service station with another plate—an old one—broken. When such is the case there is a double repair bill plus the cost of the idle time of the truck. It is difficult to determine when one or more of the old plates in a repaired spring will break as the factors of age, number and extent of deflections, fatigue, etc., cannot be determined by the service station.

Average Blacksmith Not Fitted

It is not the best or cheapest service to the customer to send his damaged spring to the blacksmith as too many not only use cheap carbon steel but have not the equipment or experience to obtain the proper heat treatment. Many blacksmiths base their tempering on experience obtained with repairing carriage springs. Supplying chilled work and slighting the finer details entering into scientific spring construction do not make for good springs but do make for poor service and repair bills to the truck owner.

The standard spring manufacturer employs a high-grade alloy steel and every lot before it leaves the freight cars is subjected to the careful tests by the chemists and metallurgists. Samples are also tested along the production line. Use is made of microscopic photography in inspecting the metal and its physical structure during the various steps of manufacture. This the blacksmith does not do.

The metal used by the blacksmith costs a few cents the pound, whereas the alloy steel used by the spring manufacturer costs approximately twice as much. When it is considered that a 50 x 3 x 3/8 in. 15 plate spring weighs approximately 160 lb. it can be seen why the blacksmith using an ordinary metal can produce a spring at a price attractive to the customer or serv-



(C) Fracture of the Spring-Eye of the Main Plate

This may be caused by seizure of the eye itself, a tight bolt or the shackles binding on the sides of the eye

ice station. It is because of the cost that some service station managers are influenced by the owner to have the spring repaired by a blacksmith. They assume that the cost of fabrication—labor—is the same, which it is not, because no blacksmith can compete with the spring manufacturer who builds on a production basis with lost motion eliminated by modern equipment and opportunity for error reduced to a minimum (human equation) by automatic recording pyrometers electrically controlling the thermostat or furnaces.

Clean Before Inspecting

When a plate breaks in a spring and it is removed from the chassis it should be carefully examined. Entirely disassemble the spring and clean both sides and edges of each plate with a wire brush to remove all dirt, etc. Unless this is done the surface of the plates cannot be properly inspected. If the plates be cleaned it will be possible to note tiny checks or cracks that sometimes appear. These are very small and will escape notice unless the plates are clean and the examination thorough. Illustration A shows a plate having a tiny crack. A plate having such will not last and will soon break. Such leaves are usually found above or below a leaf that has broken in service and demonstrates that a spring with only one leaf broken should be replaced or repaired by the spring manufacturer. Such leaves or others in a like condition, or those doubtful, should be discarded for new ones, or an entire new spring, otherwise the user will have a repetition of troubles with the same unit. Illustration B is an example of a plate cracked or marked and adjacent to a broken leaf as early referred to. Illustration C shows the main plate broken in the spring eye itself and the fracture was probably due to seizure as previously explained.

The wrapped spring eye, that is, the second plate as wrapped, and as shown in illustration D, is held to greatly strengthen the spring against twisting and other stresses of the main plate, provided the "wrapper" is properly made, i. e., of right length and installed during the proper period of its construction. A minimum buckling effect is held to be obtained under these conditions, and the eyes of the main leaf should not be heated in the fire when a "wrapper" is heated and installed, otherwise poor metallurgical conditions result at or near the eye itself.

Illustration C shows the banded type of spring. It is held that when the band is properly made and installed it prevents center breakage of the springs as well as prevents the spring shifting on its seat or saddle. It is also held that this design is essential on rear springs where the Hotchkiss drive is employed. This band is placed with a hydraulic press of 87 tons capacity and the band cannot be properly replaced by other than the spring manufacturer.

Lubricate After Repairing

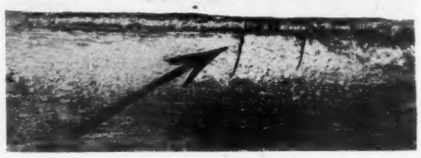
In the overhaul of the springs, and after cleaning, the frictional surfaces should be treated with a lubricant. One spring manufacturer recommends the following recipe:

Pure Beef Tallow	4.5 Parts
Graphite	4.5 "
Beeswax	1.0 "

Powdered graphite should be employed, the tallow and beeswax melted and the graphite added. Stir until cool. Apply hot to plates.

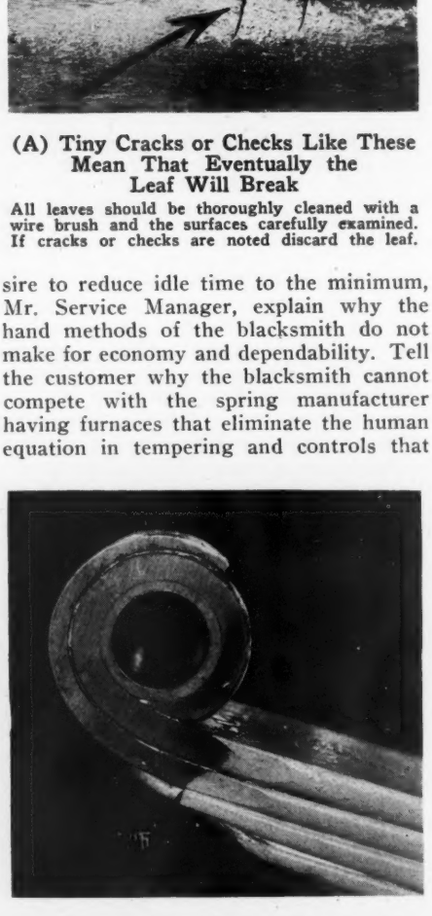
In replacing old main plates with new, care should be taken to see that the spring eyes and where shackled do not bind or seize. The bolts should not be set up too tight.

If you would give your customer the best and cheapest spring service, and desire to reduce idle time to the minimum, Mr. Service Manager, explain why the hand methods of the blacksmith do not make for economy and dependability. Tell the customer why the blacksmith cannot compete with the spring manufacturer having furnaces that eliminate the human equation in tempering and controls that keep the temperature within a few degrees plus or minus. Explain to your customer that the blacksmith has not the machines for testing the springs as they pass through the various stages of production. The test of a hand made spring is use. That by the spring manufacturer is by a special testing machine. So sell your customers on the new spring and send the old to the right company for repairs, keeping in reserve new and factory repaired units which will mean real service to your customers. You can do it, Mr. Service Manager.

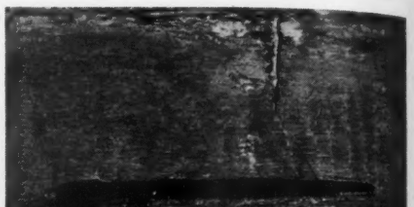


(A) Tiny Cracks or Checks Like These Mean That Eventually the Leaf Will Break

All leaves should be thoroughly cleaned with a wire brush and the surfaces carefully examined. If cracks or checks are noted discard the leaf.



(D) Wrapped Spring-Eye Employed by a Well-Known Manufacturer



(B) Showing What Happens to Leaf Adjacent to a Broken Leaf

When this condition exists the plate is useless as it will soon break

Pintle Hooks Adopted as Standards by N.A.C.C.

At the annual meeting of the motor truck members of the National Automobile Chamber of Commerce, pintle hooks were adopted as standard equipment.

It was recommended that where such hooks are attached to motor truck or tractor frames they should be of the United States Government type. The hooks should be so mounted that the axis of the draw-bar head shall be located both vertically and horizontally approximately in the center of the frame of the chassis. It is necessary therefore that means be provided for fastening one end of the safety chain to the rear end of the motor truck chassis frame; the clevis is to be located directly under the axis of the draw-bar head, or as near to this position as possible.

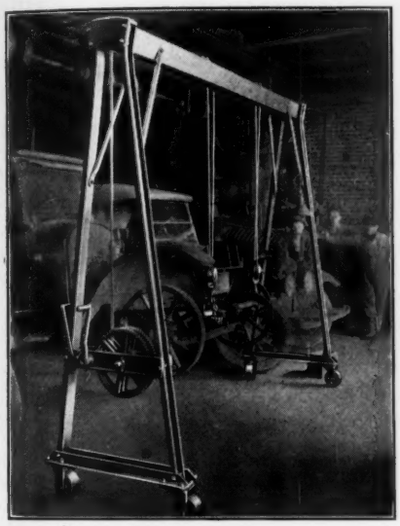
The stand taken by the Trailer Manufacturing Association of America was that it was not necessary for the truck manufacturer to place a spring behind the draw-bar head or pintle hook on the motor truck. In substantiation of this the Association stated that trailers made by reputable manufacturers have a starting and stopping spring in the draw-bar or trailer head, which is of proper length and strength; any additional springs furnished by the truck manufacturers would therefore give too much spring action and cause the trailers to bump the truck. In the interests of better protection of the truck frame and driving mechanism truck manufacturers, however, are urged to equip their draw-bar heads with springs according to the recommendation adopted by the National Chamber.

Service Station and Repair Shop Appliances

Bradney Truck Crane

A crane that will lift a truck or passenger car in the rear or front, or bodily, from a balanced center, was lately put on the market by the Bradney Machine Co., Middletown, N. Y.

Being equipped with ball bearing casters, the crane can be readily moved about, which is a feature of value in a service station. These cranes are constructed in sizes and capacities that have weights ranging from 600 lb. upward. It



Bradney Crane

is constructed in any height, ranging from 8 to 14 ft., and in any length from 8 to 10 ft., and in capacities from 1 to 4 tons.

The hoist is of the two-speed type and operates from the inside or outside of the crane. The load is lowered by brake, the lever of which is close to the vertical hoisting lever.

These cranes are equipped with one or two ball bearing hoists, as desired. The illustration herewith shows a crane equipped with two ball bearing hoists, operating over ball bearing trolleys, which move backward and forward in the hollow beam of the crane, independent of each other, but rise and fall together, whether both are loaded or not.

Holmes Automobile Wrecker

The Ernest Holmes Co., Chattanooga, Tenn., is manufacturing a device that employs a truck solely as a means of conveyance to the place where its service is required, thus placing no strain whatever on the truck during the derrick work. This device is known as the Holmes Derrick.

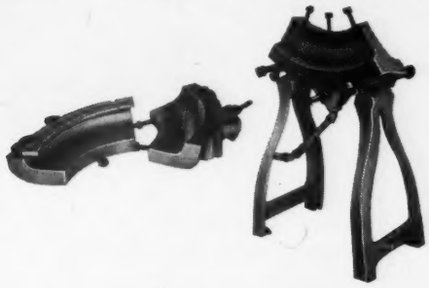
Under the Holmes system the Wrecker stands on its upright with one side anchored to any convenient tree or post and a cable running from the other side to the wrecker, stands on its uprights with one a winch, hand or power driven, as desired. While the wrecker is in action, it is pointed out, the road is not blocked, as the traffic can pass under either cable.

The equipment includes 200 ft. cables and a coupling device that, it is stated, will prevent oscillation of the car in tow. It is furnished ready for attachment.

New Western Super-Vulcanizer Outfit

The Western Rubber Mold Co., Chicago, Ill., recently added a new single and a new two-cavity vulcanizer to its line. The accompanying illustration shows the two-cavity model with the outer halves removed and with a spacer attached to one. The feature of the construction is that the molds are split in halves, one-half being stationary, the other adjustable. The halves are held together by large bolts. Adjustments, according to the size of the tire to be vulcanized, can be made by inserting spacers between the two halves. Not only can any size tire be vulcanized by reason of these spacers, but the maker goes further in a statement that these spacers will give an even cure. The clamps with the molds are also adjustable.

Steam is transmitted from one half to the other by a packed, sliding gland. In



New Western Super-Vulcanizer
Beside it are shown the outer halves of each mold with a spacer strip with one of the halves

the two-cavity type vulcanizer there is a central steam chamber and two outside adjustable halves.

The single molds are made up of a pair of outside halves, each part interchangeable. The molds are one-fifth of a circle.

Eagle Universal Aligning Fixture

The aligning fixture put out by the Eagle Machine Co., Inc., Indianapolis, Ind., is designed for use on all sizes and makes of engines. It is built to take care of all kinds of assembly work and is claimed to detect the slightest twist or bend in a connecting-rod or crooked hole in a piston.

Three specially designed and patented bushings, which fit all sizes of connecting-rod bearings from ¼ in. to 2½ in., are furnished with this tool. The selling price is $50.

Universal Crankshaft Support and Aligning Fixture

The H. & H. Machine Co., St. Louis, Mo., is offering to the trade a device for aligning connecting-rods and supporting any make or size of crankshaft so that the connecting-rod bearings can be fitted and the connecting-rods and pistons tested for alignment. By use of this device proper alignment after the crankshaft is

Universal Crankshaft Support and Aligning Fixture

assembled into the engine is assured, as each piston is squared on its own bearing.

This Universal crankshaft fixture, complete with stand and 1 mandrel, sells at $60. Extra mandrels, each, cost $3.75. The B. & S. Combination square hardened head and blade is listed at $3.90.

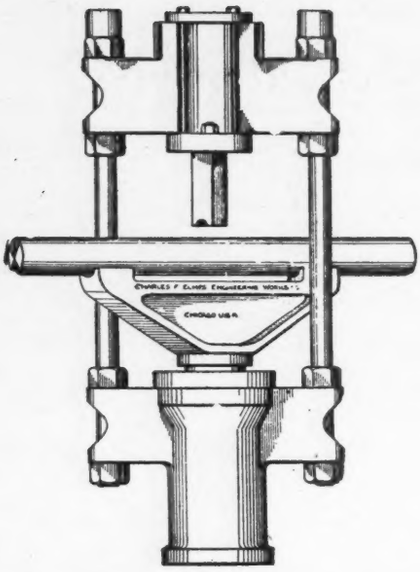
Elmes "5-in-1" Hydraulic Press

A press that is designed to meet the demands for service in small shops and which will handle a large variety of work up to 50 tons capacity, is a combination hydraulic press put out by the Chas. F. Elmes Engineering Works, Chicago, Ill.

The accompanying illustration depicts the press being employed on straightening work. As may be observed it is divided with a removable straightening attachment. Upon removing this attachment the press is in position for vertical forcing and by adding platens the press is prepared for forming or compressing.

By removal of the side bars and top head, this combination press is converted into a 50-ton jack. The maker points out that because of its light weight it can be readily handled as a portable press to be used either vertically or horizontally. Through the use of extension bars with which it is provided this press can also be utilized for forcing long shafts in or out gears, pulleys, etc.

The approximate weight of the press is 500 lb. and the distance between col-



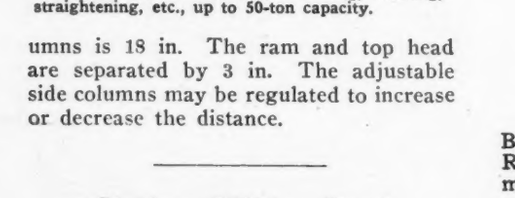
Elmes "Five-in-One" Hydraulic Shop Press

This is a press suitable for use in small shops and on repair work. Will handle forcing, bending, straightening, etc., up to 50-ton capacity.

umns is 18 in. The ram and top head are separated by 3 in. The adjustable side columns may be regulated to increase or decrease the distance.

Shaftru Milling Tool

A small light tool, known as the Shaftru milling tool, designed to true crankshaft bearings accurately, quickly and inexpensively, is the latest product of the Atherton-Salter Manufacturing Co., St. Louis, Mo.



Shaftru Crankshaft Bearing Tool

It is adjustable to bearings from 1 in. to 2¾ in. in diameter and any length from 1½ in. up.

This tool is stated to cut evenly at the desired depth from all high places around the entire circumference of a bearing, cutting alike through crystallized and soft spots. There is only one cutting blade, a blade which is made of specially tempered steel. The complete tool is constructed of steel and aluminum.

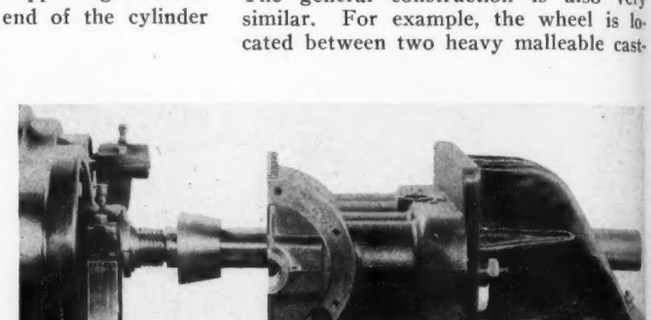
It is assembled of parts standardized and easily replaced. Adjustment to any size of bearing from 1 to 2¾-in. diam. and any length from 1½-in. up can be had. This tool is 16½ in. long and weighs 5½ lb. Sells at $100.

Re-Boring Attachment for Barnes Gap Lathes

An attachment which fits the Barnes 14-24-in. and 13-32-in. sliding extension gap lathes, thus making possible the reboring of any style or size cylinder, was lately introduced by the Barnes Drill Co., Rockford, Ill.

This appliance is claimed to permit accurate work and requires less than five minutes to cut through a 4-in. cylinder.

The attachment includes an angle bracket for clamping on the carriage of the lathe. This bracket carries a hardened bushing supplied for the boring bar. The 2½-in. diam. boring bar is provided with a Morse taper shank for fitting to the spindle, high speed steel cutter, and draw bolt through spindle for positive drive. A taper bushing is supplied for sliding in the old hole to assist in centering the cylinder, and supporting bolts for steadying the outer end of the cylinder are also included.



Barnes Cylinder Reboring Attachment

Its construction permits reboring all sizes and styles of automobile cylinders.

Kylin Adjustable General-Purpose Reamer

The Kylin general-purpose reamer, manufactured by the Foster-Johnson Reamer Co., Elkhart, Ind., is designed to enable a workman to perform his work quickly, accurately and with little trouble. This reamer can be contracted or expanded by turning one graduated nut and reading off the amount of adjustment.

The foremost feature of this tool is that it has but one adjusting nut, which is employed alike for expanding and contracting, and the fact that the amount of the adjustment can be read from graduations on the nut arranged similar to those to be found on a micrometer. The large body of the reamer is said to afford rigid support to the blades in the slots. Ample chip clearance is also provided. The properly dimensioned helical spring affords ease and accurate adjustment.

Greb General-Purpose Press

The General purpose press, manufactured by the Greb Co., Inc., Boston, Mass., is made in three sizes, namely, Nos. 14, 11 and 10.

Specifications:

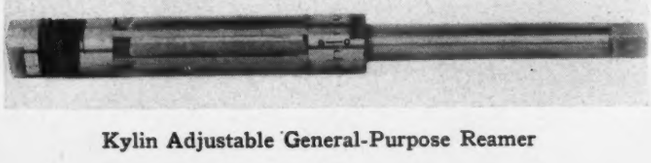
Model Dimensions	No. 14 inches	No. 11 inches	No. 10 inches
Inside width	45	32	27
Height overall	70	63	57
Height under screw	52	48	43
Top frame channels	8	7	5
Side frame channels	7	5	4
Cross bar channels	8	7	5
Screw	30x2½	30x2	26x1½
Wheel	18	18	12
2 cross blocks	12x3	10x2	8x2
Operating lever	40x1	30x1	30x1
Capacity, tons	40	30	20
Weight, pounds	650	450	300
PRICE	$200	$150	$110

Reversible ratchet wheel with ball thrust bearings are used in all models. The general construction is also very similar. For example, the wheel is located between two heavy malleable castings, as shown in the illustration and are all suitable for work of any length. In consideration of the work that can be accomplished by this machine, the amount of floor space covered by it, is negligible.

New Critchley Reamer

Chadwick & Trefethen, Portsmouth, N. H., producer of the Critchley expanding reamers, announce an addition to its line, the Critchley six reamer. This reamer is almost identical to the Critchley expanding reamer, which is made with five blades, the only differing feature being that the new model contains six blades instead of five.

This new addition does not replace the expanding reamer, which the maker states it will continue to produce. Other new additions to the Critchley line were contemplated, and will be placed on the market shortly.



Kylin Adjustable General-Purpose Reamer

Critchley New Six Expanding Reamer

Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line

Fan Belt Type: V—V-Shape, F—Flat, R—Round

Name, Model and Tonnage	ENGINE											BRAKE LINING								FRAME	
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R-1—1920	4	1/4	1										11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason RB-1½—1920	4	1/4	1										11 1/2	3 1/2	1/4	2	11 1/2	3 1/2	1/4	2	112	34
Acason H-2½—1920	3	1/4	1 1/4										13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	130	35
Acason L-3½—1920	3	1/4	1 1/4										16	3 3/4	1/4	2	16	3 3/4	1/4	2	163 3/4	35
Acason M-5—1920	3	1/4	1 1/2										18	4 1/2	1/4	2	18	4 1/2	1/4	2	167 1/2	35
Ace, Series A 1½—1920	3	1/8	1 1/4	1 1/4	V	10 3/4	2 1/4	6 1/4	2	37 1/2	1	F	12	3 1/4	1/4	4	12	3 1/4	1/4	4	122 1/2	32
Ace, Series A2½—1919-20	4	1/4	1 1/4	1 1/4	V	10 3/4	2 1/4	6	1 1/4	33	1 1/4	F	13	3 1/4	1/4	4	13	3 1/4	1/4	4	144 1/2	32
Acme ¾	3	1/8	1	1	V	11	2	11	2	38 3/4	3/4	V	12	2 3/4	1/4	4	12	2 3/4	1/4	4	110 3/8	34
Acme B-1—1916-20	3	1/8	1	1	H	11	2	11	2	38 3/4	3/4	V	12	3 1/4	1/4	4	12	3 1/4	1/4	4	110 3/8	34
Acme F-1½—1919-20	3	1/8	1	1	H	8	1 1/2	11 1/2	1 1/2	40	1 1/4	V	12	3 1/4	1/4	4	12	3 1/4	1/4	4	122	34
Acme A-2—1916-20	3	1/8	1 1/4	1 1/4	H	7	1 1/4	11	1 1/4	33 3/4	3/4	V	13	3 1/2	1/4	4	13	3 1/2	1/4	4	135 1/2	34
Acme C-3½—1917-20	3	1/4	1 1/4	1 1/4	H	12	1 3/4	8	1 1/4	33 1/2	1 1/4	F	15 1/2	3 3/4	1/4	4	15 1/2	3 3/4	1/4	4	150 1/2	36
Acme E-5—1919-20	3	1/4	1 1/2	1 1/2	H	11	2	14	2	40 1/2	2	F	18	4	1/4	4	18	4	1/4	4	160 3/8	37
American 25-2½	4	1/4	1/8	1 1/4	V	19	1 3/4	9 1/2	1 3/4	38	2	F									142	33
American 40-4	4	1/4	1/8	1 1/4	V	19	1 3/4	9 1/2	1 3/4	38	2	F	57	2 1/2	1/8	2	41 1/2	2 1/2	1/8	2	142	37
American 50-5	4	1/4	1/8	1 1/4	V	19	1 3/4	9 1/2	1 3/4	38	2	F									158	37
Apex C-1	3	1/8	1	1	V	7 1/4	2	12	2	36 1/2	1/8	....	42	2	....	2	41 1/2	2	....	2	102	35 1/2
Apex D-1½	3	1/8	1	1	V	7 3/4	2	12	2	36 1/2	1/8	....	42	2	....	2	41 1/2	2	....	2	102	35 1/2
Apex E-2½	4	1/4	1	1 1/4	V	7 1/2	1 1/4	8	2	32	1	....	54	2 1/4	....	2	53 1/4	2	....	2	128	31 1/2
Armleder 20	4	1/4	1	1	V	11 1/2	3 1/4	11 1/2	3 1/4	31 3/4	2	F	42	3	1/4	4	11 1/2	3 1/4	1/4	4	104 1/4	32
Armleder KW-3½—1916-20	4	1/4	1	1 1/4	V	13	1 3/4	16 1/2	1 1/4	36	2	F	42	3 1/2	1/4	1	16	3 3/4	1/4	8	150	36
Armleder HW-2½—1916-20	4	1/4	1 1/4	1/8	V	12 1/4	2	16 1/2	1 1/4	34	2	F	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	140	32
Atco B-1½	4	1/4	1	1/8	V	10	1 1/2	11 1/2	1 1/4	34	2	F	25 1/2	2 1/2	1/8	4	18	2 1/2	1/8	4	109 3/4	32
Atco B1-1½	4	1/4	1	1	V	11	2	11	1 1/4	31 1/2	2	F	46	2 1/2	1/8	2	46	2 1/4	1/8	2	109 3/4	32
Atco A-2½	4	1/4	1	1	V	11	2	11	1 1/4	31 1/2	2	F	25 1/2	2 1/2	1/8	4	18	2 1/2	1/8	4	124 1/4	33
Atterbury 20R-1½—1920	4	1/4	1 1/4	1 1/4	V	12	2	11	1 1/4	33 1/4	1 1/4	F	11 1/8	3 1/4	1/4	4	11 1/8	3 1/4	1/4	4	122 1/8	34
Atterbury 7CX-2½—1919-20	4	1/8	1	3/8	....	8	1 1/2	14	1 1/2	38 1/8	1 1/4	F	13 1/8	3 1/2	1/4	4	13 1/8	3 1/2	1/4	4	133 3/8	34
Atterbury 7D-3½—1917-20	3	1/8	1 1/4	3/8	...	5 3/4	1 1/4	6 3/4	1 1/4	30 1/4	1 1/4	F	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	145 3/8	37 1/2
Atterbury 8E-5—1919-20	3	1/4	1 1/2	3/8	....	8	1 1/2	6	1 1/4	30 1/4	1 1/4	F	17 3/4	4	1/4	4	17 3/4	4	1/4	4	157 1/8	37 1/2
Autocar XXI-F-2—1915-20	4	1/4	1 1/8	....	....	14	2	20 1/2	2	41	2	F	16 1/4	2 1/2	1/8	4	13	2 1/2	1/8	4	91	34
Autocar XXI-G-2—1920	4	1/4	1 1/8	....	....	3	1 1/8	4	1 1/8	....	....	....	....	2 1/2	1/8	4	13	2 1/2	1/8	4	114	34
Autocar XXVI-Y4—1920	3	1/4	1 1/8	....	....	3 1/2	1 1/2	3	1 1/2	48 3/4	1 1/2	F	25 1/2	2 3/4	1/4	4	25 1/2	2 3/4	1/4	4	121	34 1/4
Autocar XXVI-B-4—1920	3	1/4	1 1/8	....	....	3 1/2	1 1/2	3	1 1/2	48 3/4	1 1/2	F	25 1/2	2 3/4	1/4	4	25 1/2	2 3/4	1/4	4	176	34 1/4
Available H-1½—1920	4	1/8	2 1/4	1 1/8	....	11	1 5/8	14	1 5/8	40	2	....	48	2 1/2	1/4	2	36	2 1/2	1/4	2	120	32
Available H-2½—1916-20	3	1/8	2 1/4	1 1/8	....	11	1 5/8	14	1 5/8	40	2	....	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	144	32
Available H3—1916-20	3	1/8	2 1/2	1 1/8	....	11	1 5/8	14	1 5/8	42	2	....	16	3 3/4	1/4	4	16	3 3/4	1/4	4	168	36
Available H5—1916-20	3	1/4	2 1/2	1 1/8	....	12	2	16	2	40	2	....	18	4	1/4	4	18	4	1/4	4	168	38
Available H7—1919-20	3	1/4	2 1/2	1 1/8	....	12	2	16	2	40	2	....	72	3 1/2	1/4	2	72	3 1/2	1/4	2	168	38
Avery 1—1920	3	1/8	....	1	....	10	2	6 1/2	2	31 3/4	1 1/2	F	19 1/2	2	1/8	4	18 1/2	2	1/4	4	85	34
Bartlett 70-7	3	1/4	1 1/2	1 1/2	....	....	....	....	....	....	....	....	50	2 1/2	1/4	2	....	4	1/4	2	144	36
Beck-Hawkeye A-1—1912-20	....	....	1 1/2	1 1/4	....	....	....	....	....	....	....	....	24	2	1/8	1	24	2	1/8	1	114	54
Beck-Hawkeye B-1½—1912-20	....	....	1 1/2	1 1/4	....	....	....	....	....	....	....	....	24	2	1/8	1	24	2	1/8	1	114	66
Beck-Hawkeye C-2—1912-20	....	....	1 3/4	1 1/2	....	....	....	....	....	....	....	....	25	2 1/4	1/8	1	25	2 1/4	1/8	1	114	66
Beck-Hawkeye D-3—1920	3	1/8	1 3/4	1 1/2	....	....	....	....	....	....	....	....	25	2 1/4	1/8	1	25	2 1/4	1/8	1	136	72
Bell M1	4	1/8	1	1/8	V	....	....	....	....	....	....	....	36	2 1/2	1/8	1	42	3	1/4	1	110	34
Bell E-1½	4	1/4	1	1/8	....	....	....	....	....	....	....	....	39	2 1/2	1/8	1	48	3	1/4	1	114	34
Bell O-2½	4	1/8	1 1/4	1/8	....	....	....	....	....	....	....	....	48	2 1/2	1/8	1	54	3	1/4	1	126	34
Belmont A-1	....	....	1	1 1/2	....	....	....	....	....	....	....	....	32	2	1/8	2	31	1 1/2	1/4	2	78	34
Belmont B-1½	....	....	1	1 1/2	....	....	....	....	....	....	....	....	41	2	1/4	2	40	1 1/2	1/4	2	120	36
Belmont C-2	....	....	1	1 3/4	....	....	....	....	....	....	....	....	41	2 1/2	1/4	2	40	2	1/4	2	124	36
Bessemer G-1—1917-20	3	1/8	1	1/8	V	10	2 1/4	11 1/2	2 1/4	42	5/8	V	47 1/2	2	1/8	2	45 1/2	2 1/4	1/8	2	98	34
Bessemer H-2-1½—1917-20	3	1/8	1	1/8	V	10	2 1/4	11 1/2	2 1/4	43	5/8	V	56 1/2	2 1/2	1/8	2	55	2 1/4	1/8	2	116	34
Bessemer J2-2½—1919-20	3	1/8	1 1/4	1/8	V	5	1 7/8	12	2 1/2	36 1/4	1 1/4	F	56 1/2	2 1/2	1/8	2	55	2 1/4	1/8	2	141	34
Bessemer K2-4—1919-20	3	1/8	1 1/4	1/8	V	10	2 1/4	11 1/2	2 1/4	39 3/8	1 1/2	F	58 1/2	3 1/2	1/8	2	30 1/4	4 1/2	1	1	157 1/2	38
Bethlehem K-1—1920	3	1/8	1	1/4	....	....	....	....	....	....	....	....	49	2	1/8	1	21	2	1/8	2	90	32 1/8
Bethlehem G-2—1920	3	1/8	1 1/4	1/4	....	....	....	....	....	....	....	....	43	2 1/2	1/8	1	40 1/8	1 3/4	1/8	2	120	34 1/2
Bethlehem H-3—1920	3	1/8	1 1/4	1/4	....	....	....	....	....	....	....	....	51	3	1/8	1	49	2	1/8	2	132	34 1/2
Bethlehem J-4—1920	3	1/4	1 1/4	1/4	....	....	....	....	....	....	....	....	55	3	1/4	1	50	2	1/8	2	156	34
Brinton F-2½—1914-1920	3	1/8	1 1/8	3/8	....	11	1 1/4	13	1 1/4	33	1/8	F	13	3 1/2	1/4	2	13	3 1/2	1/4	2	135 1/2	33
Brockway S2-1½—1919-20	3	1/8	1	....	V	10 1/2	2 1/4	5 1/2	2 1/4	39	1 1/4	F	20	2	1/8	4	20	2	1/8	4	118	32
Brockway K4-2½—1919-20	3	1/8	1 1/4	....	V	6 1/2	1 3/4	13	1 1/4	34	1 1/4	F	12	3 3/8	1/8	4	12	3 3/8	1/8	4	142	34
Brockway R-2-3½—1919-20	3	1/8	1 1/4	....	V	9 1/2	1 3/4	14	1 1/4	34	1 1/2	F	15 5/8	3 3/4	1/8	4	15 3/8	3 3/4	1/8	4	176	36
Brockway T-5—1919-20	3	1/4	1 1/2	....	V	13	2	22	2	40 3/4	2	F	18	4	1/4	4	18	4	1/4	4	176	36
Capitol G1½	4	1/8	1 1/8	1 1/8	V	18	1 3/4	18	1 1/4	32 1/8	1 1/4	F	47 1/8	2 1/2	1/8	1	33 1/4	2 1/2	1/8	1	120	32
Capitol H-2½ and K-2½	3	1/4	1 1/8	1 1/8	V	18	1 3/4	18	1 1/2	39 1/2	2	F	57 1/2	2 1/2	1/8	1	42 1/2	2 1/2	1/8	1	132	34
Capitol M-3½	3	1/4	1 1/8	1 1/8	V	18	1 3/4	18	1 1/2	39 1/2	2	F	57 1/2	2 1/2	1/8	1	42 1/2	2 1/2	1/8	1	144	34
Chicago C-1½—1919-20	4	....	1	1 1/2	....	....	....	....	....	....	....	....	12 1/8	3 1/4	1/4	4	12 1/8	3 1/4	1/4	4	123	32
Chicago C-2½—1919-20	4	....	1 1/4	1 3/4	....	....	....	....	....	....	....	....	13 3/4	3 1/2	1/4	4	13 3/4	3 1/2	1/4	4	135	32
Chicago C-3½—1919-20	4	....	1 1/4	1 3/4	....	....	....	....	....	....	....	....	16	3 3/4	1/4	4	16	3 3/4	1/4	4	180	36 1/4
Chicago D-5—1920	4	....	1 1/4	1 3/4	....	....	....	....	....	....	....	....	18	4	1/4	4	18	4	1/4	4	180	36 3/4
Climber A-20	3	1/8	1	1 1/4	H	....	....	....	....	....	....	1	16	2 1/4	1/4	2	16	2 1/8	1/8	2	120	34
Clydesdale 120C-5	4	1/4	1 1/8	1/8	V	6 1/4	2	18 1/2	2	46 1/2	2	F	18	4	1/4	4	18	4	1/4	4	131	38
Clydesdale 90C-3½	4	1/8	1 1/8	1/8	V	11	1 1/2	11	1 1/2	48 1/2	1 1/2	F	16	3 3/4	1/4	4	16	3 3/4	1/4	4	142	38
Clydesdale 65EC 2½	4	1/8	1 1/8	1/8	V	11	1 1/2	11	1 1/2	48 1/2	1 1/2	F	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	130 5/8	33 1/4
Clydesdale 65C-2½	4	1/8	1 1/8	1/8	V	11	1 1/2	11	1 1/2	48 1/2	1 1/2	F	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	130 5/8	33 1/4
Clydesdale 42C-1½	4	1/8	1 1/8	1/8	V	9	1 1/2	9	1 1/2	43	1 1/2	F	12	3 1/4	1/4	4	12	3 1/4	1/4	4	115	34
Clydesdale 32-C-1	4	1/8	1 1/8	1/8	V	9	1 1/2	9	1 1/2	43	1 1/2	F	20	1 3/4	1/4	4	20	1 3/4	1/4	4	115	34
Clydesdale 18-¾	4	1/8	1 1/8	1/8	V	10	2	8 1/2	2	39	....	V	11	2 1/2	1/4	4	11	2 1/2	1/4	4	92 3/8	34
Collier 18-1—1919-20	3	1/8	1	....	V	9 3/4	2	10 1/2	1 1/4	40	1	F	24	3 1/2	1/4	4	24	3 1/2	1/4	4	106	35 1/4
Collier 19-1½—1919-20	3	1/8	1	....	V	9 3/4	2	10 1/2	1 1/4	40	1	F	24	3 1/2	1/4	4	24	3 1/2	1/4	4	120	32
Collier 21-2—1918-20	3	1/8	1 1/2	....	V	6	1 1/2	10 1/2	1 1/4	40	1	F	27 1/2	3 1/2	1/8	4	27 1/2	3 1/2	1/8	4	132	32
Collier 22-2½—1919-20	3	1/8	1 1/2	....	V	6	1 1/2	10 1/2	1 1/4	40	1	F	27 1/2	3 1/2	1/8	4	27 1/2	3 1/2	1/8	4	144	32
Columbia G-2½—1920	3	1/8	1 1/4	1 1/4	V	11	1 1/4	10	1 1/4	38	1 1/4	F	55	3	1/8	2	50	2	1/8	2	132	32 1/2

Replacement Table—Continued

Name, Model and Tonnage	ENGINE												BRAKE LINING								FRAME	
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Commerce T-1500	3	1/8	1	1/8	V	10	2	10	2	44	3/4	V	50	2	1/8	2	48 1/2	2	1/8	2	92 5/8	34
Commerce 12-3000	3	1/8	1	1/8	V	10	2	10	2	44	3/4	V	45	2 1/2	1/8	2	43	2 1/4	1/8	2	92 5/8	34
Commerce 16-4000	3	1/8	1	1/8	V	10	2	10	2	44	3/4	V	45	2 1/2	1/8	2	43	2 1/4	1/8	2	108 5/8	34
Concord A-1½—1920	4	1/4	1 1/4	1/8	H	11	2 5/8	9 1/2	1 1/2	34	2	F	12	3 1/4	1/4	4	12	3 1/4	1/4	4	108 1/4	32 1/4
Concord B-2½—1920	4	1/4	1 1/4	1/8	H	11	2 5/8	9 1/2	1 1/2	34	2	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	122 1/2	32 1/4
Corbitt E-1—1917-20	3	1/8	1	1/8	....	8	2	14	2	38	5/8	V	19	2	1/8	2	19	2	1/8	2	105	34
Corbitt D-1½—1916-20	3	1/8	1 1/4	1/8	....	8	2	14	2	38	5/8	V	45 1/4	2	1/4	1	45 1/4	2	1/4	1	120	34
Corbitt C-2—1915-20	3	1/8	1 1/4	1/8	....	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt B-2½—1916-20	3	1/8	1 1/4	1/8	....	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt AA-5—1919-20	3	1/4	1 1/2	1/8	....	13	1 1/4	8	1 1/4	36	2	V	69 1/4	3	1/4	1	69 1/4	3	1/4	1	160	38
Corbitt A-3½—1917-20	3	1/8	1 1/4	1/8	....	13	2	14	2	36	1 1/4	V	64	2 1/2	1/4	1	64	2 1/2	1/4	1	160	35
Couple Gear HC-3½.—1906-20	3	....	2	1 3/4	....	12	2	.....	....	39	1	....	48	3	1/4	2	.....	.....	.....	.....	168	42
Couple Gear AC-5--1908 20	3	....	2	1 3/4	....	12	2	.....	....	39	1	....	48	3	1/4	.....	.....	.....	.....	.....	168	42
Couple Gear LD-6—1917-20	3	....	2	1 3/4	....	12	2	.....	....	39	1	....	48	3	1/4	.....	.....	.....	.....	.....	168	42
Cyclone A-3000	3	1/16	1	1	V	16	2	16	2	32 1/2	1 1/4	....	15	2 1/2	1/8	4	12	2 1/4	1/16	2	113	34
Dart H-1—1920-21	3	1/8	1 1/4	1 1/8	H	11	2	8	1 3/4	36	1	F	19	1 3/4	1/8	4	19	1 3/4	1/8	4	102	34
Dart S-1½—1920-21	3	1/8	1 1/4	1 1/8	H	11	2	8	1 3/4	36	1	F	19	1 3/4	1/8	4	19	1 3/4	1/8	4	112	34
Dart M-2½—1920-21	4	1/4	1 1/4	1 1/8	H	11	2	14	1 1/4	35	2	F	10	2 1/2	1/4	2	19	3 1/2	1/4	4	124	34
Dart W-3½—1920-21	4	1/4	1 1/2	2	H	11	2	12	1 1/2	36	2	F	28	2 3/4	1/4	4	28	2 3/4	1/4	4	144	38
Day-Elder A-1	3	1/8	1 1/4	1/8	V	9	2	9 1/2	2	40	5/8	V	19	2	1/4	4	19	2	1/4	4	108	35
Day-Elder B-1½	3	1/8	1 1/4	1/8	V	9	2	9 1/2	2	40	5/8	V	19	2	1/4	4	19	2	1/4	4	120	35
Day-Elder D-2	3	1/8	1 1/4	1/8	V	4	1 1/2	9	1 3/8	35	5/8	V	45	2	1/4	2	45	2	1/4	2	125	35
Day-Elder C-2½	3	1/4	1 1/4	1/8	V	10 1/2	2	12	1 3/8	36 3/4	2	F	52	2 1/4	1/4	2	52	2 1/4	1/4	2	123	35
Day-Elder F-3½	3	1/8	1 1/2	1/8	V	6 3/4	1 3/4	12	1 1/4	35 1/4	1 1/2	F	56 1/2	2 1/2	1/4	2	56 1/2	2 1/2	1/4	2	148	35
Day-Elder E-5	3	1/4	1 1/2	1/8	V	12 1/2	2	10	1 3/8	38 1/2	1 1/2	F	69	3	1/4	2	69	3	1/4	2	155	37
Dearborn BW-2—1915-17-19-20	3	....	1	.....	....	8 3/4	2	6	1 3/4	37	1	F	18	2 1/2	1/8	2	18	1 1/2	1/8	2	130	32
Dearborn F-1½—1915-17-19-20	3	....	1	.....	....	12	2	8	1 3/4	37	1	F	16 1/2	2 1/2	1/8	2	16 1/2	1 1/2	1/8	2	96 1/2	34
Dearborn C-1—1915-17-19-20	3	.....	3/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	38	2	1/8	1	38	2	1/8	1	107	32
Defiance B-1½—1918-19-20	3	1/8	1	1	V	10	2	8	2	40 3/4	1 1/4	F	45	2 1/2	1/8	1	43	2 1/4	1/8	1	116	34
Defiance C-2—1918-19-20	3	1/8	1	1	V	10	2	8	2	40 3/4	1 1/4	F	54 1/8	2 1/2	1/8	1	52 1/2	2 1/4	1/8	1	116	34
Defiance D—1920-21	3	1/8	1	1	V	10	2	8 1/2	1 1/4	40 3/4	1 1/4	F	45	2 1/2	1/8	1	43 1/8	2 1/4	1/8	1	120	34
Defiance E—1920-21	3	1/8	1	1	V	10	2	8 1/2	1 1/4	40 3/4	1 1/4	F	54 1/8	2 1/2	1/8	1	52 1/2	2 1/4	1/8	1	120	34
Denby 12-1—1921	3	1/8	1	1	....	12	2	9	2	42	3/4	V	43 1/16	2 1/2	1/8	2	40 1/16	1 3/4	1/8	2	98	34
Denby 33-1½—1921	3	1/8	1	1	....	12	2	9	2	42	3/4	V	8 1/2	4	1/4	2	46 1/2	1 1/2	1/16	2	120	34
Denby 134-2—1921	3	1/8	1	1	....	12	2	9	2	42	3/4	V	53 1/16	3	1/8	2	50 11/16	2	1/8	2	127	34
Denby 25-3—1921	3	1/8	1 1/4	1 1/4	....	12	2	9	2	35	1 1/4	F	56 1/4	3	1/8	2	47 1/4	2	1/8	2	127	34
Denby 27-4—1921	3	1/8	1 1/4	1 1/4	....	13	1 3/4	16 1/4	1 1/4	39 3/4	1 1/2	F	8 1/2	4	1/4	2	58	2 1/2	1/16	2	140	34
Denby 210-5—1921	3	1/8	1 1/4	1 1/4	....	13	1 3/4	16 1/4	1 1/4	39 3/4	1 1/2	F	8 1/2	4	1/4	2	89	2 1/4	1/16	2	140	34
Dependable Dispatch A-1 1921	4	1/8	1	1/8	V	14	2 1/4	15	1 1/4	37 1/2	2	F	53 1/4	2 1/4	1/8	1	38 1/4	2 1/4	1/8	1	108	33 1/2
Dependable C-1½—1920-21	4	1/8	1	1/8	V	14	2 1/4	15	1 1/4	37 1/2	2	F	53 1/2	2 1/2	1/8	1	38 1/2	2 1/2	1/8	1	121	33
Dependable D-2 1920-21	4	1/4	1 1/4	1/8	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2	F	53 1/2	2 1/2	1/8	1	38 1/2	2 1/2	1/8	1	140	33
Dependable E-2½—1920-21	4	1/4	1 1/4	1/8	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2	F	63	2 1/2	1/8	1	49	2 1/2	1/8	1	152	33
Dependable G-3½ 1921	4	1/4	1 1/4	1/8	V	13	2	13	1 1/4	37 1/2	2	F	63	2 1/2	1/8	1	49	2 1/2	1/8	1	170	33
Diamond T-O-1	3	1/8	1	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	10 3/4	3	1/4	4	10 3/4	3	1/4	4	100	34
Diamond T-FS&T-1½	3	1/8	1	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	11 1/2	3 1/4	1/4	4	11 1/2	3 1/2	1/4	4	Opt	34
Diamond T-U-2	3	1/8	1 1/4	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	Opt	34
Diamond TK-3½	3	1/8	1 1/4	1 1/2	V	10	1 1/2	10	1 1/2	35	2	F	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	Opt	37
Diamond T-EL-5	3	1/8	1 1/4	1 1/2	V	10	1 1/2	10	1 1/2	35	2	F	18	4	1/4	4	17 11/16	4	1/4	4	Opt	37
Diamond T-S-5	3	1/8	1 1/2	1 3/4	V	9	2	21	2	40 3/8	2	F	18	4	1/4	4	17 11/16	4	1/4	4	Opt	37
Diehl A	3	....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	28	2 1/2	1/8	2	27	2	1/8	2	90	.....
Doane 2½—1917-18-19-20	3	1/4	1 1/4	1/8	H	9	1 1/4	12	1 1/4	32	1 1/2	F	35	3	1/4	2	18	3 1/2	1/4	4	126	53
Doane 3½—1920	3	1/4	1 1/4	1/8	H	12	1 1/4	15	1 1/2	38 3/8	1 1/2	F	35	3	1/4	2	18	3 1/2	1/4	4	156	58
Doane 6—1917-18-19-20	3	1/4	1 1/2	1/8	H	15	1 1/4	17 1/2	1 1/4	43	1 1/2	F	38	3	1/4	2	24	4	1/4	4	168	64
Dodge Bros.-½—1920-21	3	1/8	1	1/8	....	7	1 1/2	7 1/4	1 1/8	31	1	F	19 1/4	2 1/4	1/8	2	14 3/4	1 3/4	1/8	2	47 3/8	38
Dorris K-2-2½—1918-20	3	1/4	1 1/4	1 1/4	V	2 1/4	1 1/2	6 1/4	1 1/4	40 3/8	1	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	142 3/4	34
Dorris K7-3½—1919-20-21	3	1/4	1 1/4	1 1/4	V	2 1/4	1 1/2	6 1/4	1 1/4	40 3/8	1	F	15 3/4	3 3/4	1/4	4	15 3/4	3 3/4	1/4	4	179 1/2	36
Double Drive B3	4	1/4	1 1/4	1 3/4	....	.....	.....	.....	.....	.....	.....	.....	29	2 1/4	1/4	1	29	2 1/4	1/4	1	124	36
Douglas GW-1½	3	....	1 1/4	1/4	....	.....	.....	.....	.....	.....	.....	.....	45	2 1/2	1/8	2	44	2 1/4	1/8	2	118	31
Douglas G-1½	3	....	1 1/4	1/4	....	.....	.....	.....	.....	.....	.....	.....	46	2 1/2	1/8	2	44	2 1/4	1/8	2	118	31
Dougls H-2	3	....	1 1/4	1/4	....	.....	.....	.....	.....	.....	.....	.....	55	2 1/2	1/8	2	52	2 1/4	1/8	2	118	31
Douglas HW-2	3	....	1 1/4	1/4	....	.....	.....	.....	.....	.....	.....	.....	54	2 1/2	1/8	2	42	2 1/4	1/8	2	118	31
Douglas I-3	3	....	1 1/4	1/4	....	.....	.....	.....	.....	.....	.....	.....	58	2 1/2	1/8	2	44	2 1/4	1/8	2	132	31
Duplex E-3½	3	1/4	1 1/4	1	....	.....	.....	.....	.....	.....	.....	.....	9 1/2	2 1/2	1/4	2	5 1/2	2 1/2	1/4	2	126	39 1/2
Duplex A	....	.....	1 1/4	1 1/2	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	4	.....	2	.....	4	121	34
Duty 2—1921	3	1/8	1 1/2	1 1/4	V	7	2 1/4	18	2	38	1	F	45	2 1/2	1/8	1	40	1 3/4	1/8	1	123	44
Eagle 100-2	4	1/8	1 1/4	1	....	14	2	16	1 1/4	33 3/8	2	....	49 1/2	3	1/4	1	46	2	1/4	1	Opt	36
Fageol 1½—1920	3	1/4	1 1/8	1 1/2	V	15 1/2	1 1/4	7	....	31	5/8	V	19 1/4	1 3/4	1/4	2	19 1/4	1 3/4	1/4	2	120	30
Fageol 2½—1917-20	3	1/4	1 1/8	1 1/8	V	10	1 1/4	14 1/2	....	34 3/4	1 1/2	F	13 1/4	3 1/2	1/4	2	13 1/4	3 1/4	1/4	2	141	34
Fageol 4500—1917-20	3	1/4	1 5/8	2	V	9	1 1/4	17 1/2	....	40 1/2	1 1/2	F	15 1/2	3 3/4	1/8	2	15 1/2	3 3/4	1/8	2	159 1/2	37 1/4
Fageol 5300—1917-20	3	1/4	1 5/8	2	V	9	1 1/4	17 1/2	....	40 1/2	1 1/2	F	18	4	1/8	2	18	4	1/8	2	161 1/4	37 1/4
Fargo O17, P18-2, P19-2, P20-2	3	1/8	.....	1 1/8	.....	10	2	10	2	42	5/8	V	52	3	1/8	2	50 1/2	2	1/8	2	132	33
Federal SD-1-1½	4	1/8	1	1 1/8	V	15	1 1/2	7	1 1/2	35 5/8	1	F	10 11/16	3	1/4	4	10 11/16	3	1/4	4	112	34
Federal TE-1½-2	3	1/8	1 1/4	1 1/2	V	7	1 1/4	6	1 1/2	32 1/2	1	F	13 1/8	3 1/2	1/4	4	13 1/8	3 1/2	1/4	4	118	34
Federal UE-2-2½	3	1/8	1 1/4	1 1/2	V	7	1 1/4	6	1 1/2	32 1/2	1	F	13 1/8	3 1/2	1/4	4	13 1/8	3 1/2	1/4	4	134	34
Federal WE-3½-4	3	1/8	1 1/4	1 1/2	V	12 1/2	1 1/4	9	1 3/4	39	1 1/2	F	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	154	38
Federal X-2-5-6	4	1/4	1 1/2	2	V	10	2 1/8	14 1/16	1 7/8	40 7/8	1 3/4	F	17 11/16	4	1/4	4	17 11/16	4	1/4	4	154	38
Federal Light Duty	3	1/8	1 1/4	1 1/2	V	7	1 1/4	6	1 1/2	32 1/2	1	F	13 1/8	3 1/2	1/4	4	13 1/8	3 1/2	1/4	4	86	34
Federal Heavy Duty	3	1/8	1 1/4	1 1/2	V	12 1/2	1 1/4	9	1 3/4	39	1 1/2	F	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	82	38
Ford T-1	3	1/4	1.06	1 1/8	H	4	2	.....	1 3/4	26	1 1/8	F	23 1/16	1 1/8	1/16	1	12	1 1/8	1/8	2	60	23
Front Drive C1½	4	1/8	1	1 1/2	....	.....	.....	.....	.....	.....	.....	.....	13	3	1/4	2	15	3	1/4	2	124	36
F.W.D. B-3	3	1/4	1 1/16	1/8	....	.....	.....	.....	.....	.....	.....	.....	27	3 1/2	1/4	1	43	2 3/4	1/4	2	136	36
Garford 15-¾-1921	....	.....	1	.....	.....	.....	.....	.....	.....	34	1 1/2	....	11	2 1/2	1/4	4	11	2 1/2	1/4	4	96	34
Garford 25-1¼—1920	3	1/8	1 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	37 1/8	1	....	11 3/4	3 1/4	1/4	4	11 3/4	3 1/4	1/4	4	108	34
Garford 70H-2—1920	4	1/4	1 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	34 1/8	2	....	13 1/8	3 1/2	1/4	4	13 1/8	3 1/2	1/4	4	121	34
Garford 77D-3½--1920	4	1/4	1 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	2	....	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	144	36
Garford 68D-5-1921	4	1/4	1 1/2	.....	.....	.....	.....	.....	.....	.....	.....	.....	41 1/8	2	....	17 3/4	4	1/4	4	17 3/4	4	1/4	4	150	36
Garford 150-A-7½-1921	4	1/4	1 1/2	.....	.....	.....	.....	.....	.....	.....	.....	.....	41 1/16	2	....	10 1/2	4	3/8	2	21 5/8	4	1/4	4	150	36
Gary GT-1½	4	1/4	1 1/4	3/8	....	10	2	12	1 1/4	32	1 1/4	F	24	3 1/4	1/4	2	24	3 1/4	1/4	2	120	34
Gary J-2½	4	1/4	1 1/4	3/8	....	10	2	12	1 1/4	33	2	F	27	3 1/2	1/4	2	27	3 1/2	1/4	2	120	34
Gary K-3½	4	1/4	1 1/4	3/8	....	13 1/2	2	18	1 1/4	35	2	F	32	3 3/4	1/4	2	32	3 3/4	1/4	2	148	36 1/4
Gary M-5	4	1/4	1 1/2	3/8	....	12	2	16	1 1/4	37	2	F	36 1/2	4	1/4	2	36 1/2	4	1/4	2	168	39
Gersix K-2½—1920	4	1/4	1 1/4	1 1/4	H	12	2	14	1 1/4	36	2	....	20	2 1/2	1/4	4	47	2 1/4	1/4	2	131	34
Gersix M-1½—1920	4	1/4	1 1/4	1 1/4	H	12	2	14	1 1/4	36	2	....	46	2	1/4	2	46	2	1/4	2	114	32
Gersix L-3½	4	1/4	1 1/4	1 1/4	H	13 1/2	2	16	1 1/4	36	2	....	56	2 1/2	1/4	2	56	2 1/2	1/4	2	144	36 1/2
Giant 15A-1½	3	1/8	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	19	2	1/8	4	19	2	1/8	4	116 1/2	32
Giant 16-2½	3	1/8	1 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	45 1/2	2	1/8	2	45 1/2	2	1/8	2	140 1/2	33
Giant 17-3½	3	1/8	1 1/2	.....	.....	.....	.....	.....	.....	.....	.....	.....	56 1/2	2 1/2	1/4	2	46 1/2	2 1/2	1/4	2	183 1/2	36
Globe D-20	3	1/8	1	1	.....	.....	.....	.....	.....	.....	.....	.....	21	2	1/8	1	23 1/4	2	1/8	1	75	33 1/8
G.M.C. K-15	4	1/8	1 1/4	1 5/8	V	8 3/4	1 1/2	8 1/8	1 1/2	33 5/8	1 1/16	V	49 5/8	2 1/8	1/8	2	47	2 3/8	1/8	2	89	31
G.M.C. K-16	4	1/8	1 1/4	1 5/8	V	8 3/4	1 1/2	8 1/8	1 1/2	33 5/8	1 1/16	V	49 5/8	2 1/8	1/8	2	47	2 3/8	1/8	2	89	31
G.M.C. K-41	4	1/4	1 1/4	1 5/8	V	10 1/16	1 3/4	9 1/2	1 3/4	37 1/8	1 1/16	V	13	3 1/2	1/4	4	13	3 1/2	1/4	4	Opt	33
G.M.C. K-71	4	1/4	1 1/4	1 5/8	V	11 3/4	1 3/4	9 1/2	1 3/4	37 1/8	1 1/16	V	15 1/4	3 3/4	1/4	4	15 1/4	3 3/4	1/4	4	Opt	38

Replacement Table—Continued

Name, Model and Tonnage	ENGINE												BRAKE LINING								FRAME	
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
G.M.C. K-101	4	1/4	1 1/4	1 5/8	V	11 3/4	1 3/4	9 1/2	1 3/4	37 1/8	1 1/16	V	17 3/4	4	1/4	4	17 3/4	4	1/4	4	Opt	38
Gove A-1-2½	3	1/8	1 1/4										54 1/16	2 1/2	1/16	2	24 1/4	2 1/4	1/16	4	119 1/2	34
Gramm-Bernstein 10—1920	3	1/8	1	1 1/2	H																97	30
Gramm-Bernstein 15-1½—1920	3	1/8	1	1 1/2	H	10 1/4	2	6	2	39	1 1/4	F	48 1/2	2	1/8	2	45 7/8	1 1/2	1/8	2	126	32
Gramm-Bernstein 65-1½—1920	3	1/8	1	1 1/2	V	10 1/4	2	6	2	39	1 1/4	F	19 3/4	1 3/4	1/8	4	19 3/4	1 3/4	1/8	4	120	32
Gramm-Bernstein 20-2—1920	3	1/8	1 1/4	1 1/2	V	4 1/2	1 1/2	12	1 1/2	32	2	F	45	2	1/8	4	45	2	1/8	4	120	32
Gramm-Bernstein 25-2½—1920	3	1/4	1 1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	2	F	22 3/4	2 1/4	1/4	4	22 3/4	2 1/4	1/4	4	126	32 1/16
Gramm-Bernstein 30	3	1/4	1 1/4	1 1/2									22 3/4	2 1/4	1/4	4	22 3/4	2 1/4	1/4	4	129 3/4	36
Gramm-Bernstein 35-3½—1920	3	1/4	1 1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	2	F	22 3/4	2 1/4	1/4	4	22 3/4	2 1/4	1/4	4	129 3/4	36
Gramm-Bernstein 50-5—1920	3	1/4	1 1/2	1 3/4	V	23 1/4	2	13 3/4	1 7/8	40 3/4	2	F	28 3/4	2 3/4	1/4	4	28 3/4	2 3/4	1/4	4	144	36
Hall 2-Worm-2½	3	1/8				8	1 1/4	12 1/2	1 1/4	32	1 1/4	F	32 11/16	2 3/4	1/4	4	32 11/16	2 3/4	1/4	4	162	36
Hall 3½-Worm	3	1/8				12 1/2	1 3/4	15 1/2	1 1/4	38 1/8	1 1/2	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	144	38
Hall 5-Worm	3	1/8				12 1/2	1 3/4	15 1/2	1 1/4	38 1/8	1 1/2	F	15	3 3/4	1/4	4	15	3 3/4	1/4	4	180	39
Hall 7-Chain	3	1/8				12 1/2	1 3/4	15 1/2	1 1/4	38 1/8	1 1/2	F	18	4	1/4	4	18	4	1/4	4	144	39
Harvey WEA-1½—1919-20	4	1/4											18	4	1/4	4	18	4	1/4	4	144	39
Harvey WFA-2½—1919-20	4	1/4											46	2	1/4	2	46	2	1/4	2	120	32
Harvey WHA-3½—1919-20	4	1/4											52	2 1/4	1/4	2	52	2 1/4	1/4	2	126 1/2	32
Harvey WKA-5—1919-20	4	1/4											56	2 1/2	1/4	2	56	2 1/2	1/4	2	144	35
Hawkeye K-1½—1918-20	4	1/8	1 1/4	1 1/2		11	2 1/2	9	1 1/4		2	F	69	3	1/8	2	69	3	1/8	2	144	35
Hawkeye M-2—1919-20	4	1/8	1 1/4	1 1/2		11	2 1/2	9	1 1/4		2	F	48	2	1/8	2	47	1 1/2	1/8	2	112	34
Hendrickson I-2½	3	1/4	1 1/4	1/8									54	2 1/2	1/8	2	52	2	1/8	2	112	34
Hendrickson J-3½	3	1/4	1 1/4	1/8									12	3 1/2	1/8	4	12	3 1/2	1/8	4	Opt	32 1/2
Hendrickson K-5	3	1/4	1 1/2	1/8									16	3 3/4	1/8	4	16	3 3/4	1/8	4	Opt	36
Highway Knight A	3	1/4	1 11/16	1 11/16		14	2 3/4	10	2 3/4	53	5/8	V	18	4	1/4	4	18	4	1/8	4	Opt	38
Highway Knight B-5	3	1/4	1 11/16	1 11/16		14	2 3/4	10	2 3/4	53	5/8	V	57	2 1/2	1/4	2	57	2 1/2	1/4	2	147	38
Higrade A18-1—1918-19	3	1/8	1	1	V	9	2	7	2	32	1/2	R	69	3	1/4	2	69	3	1/4	2	147	38
Higrade B20-1½—1919-20	3	1/8	1 1/8	1/8	V	9	2	7	2	32	1/2	R	12	1 1/2	1/4	2	12	1 1/2	1/4	2	85	32
Holmes 4WD-2	3	1/8	1 1/2										18	2	1/4	2	18	2	1/4	2	100	32
Huffman B-1½—1919-20	3	1/8	1	1/8									24	2	1/4	1	46	3	1/8	2	120	30
Huffman C-1½—1919-20	3	1/8	1	1/8									44	2 1/4	1/8	2	44	1 1/2	1/8	2	123	32
Hurlburt A1½-2	3	1/8	1 1/4	1									46	2 1/2	1/8	2	44	2 1/4	1/8	2	123	32
Hurlburt B2½	3	1/8	1 1/4	1									22	2	1/4	2	22	2	1/4	2	132	35 1/2
Hurlburt C3½-4	3	1/4	1 1/2	1 1/4									24	2 1/2	1/4	2	23	2 1/2	1/4	2	154	34
Hurlburt D5-5½	3	1/4	1 1/2	1 1/4									26	3	1/4	2	25	3	1/4	2	144 1/2	34
Huron-Erie 1½	4		1	1 1/2									28	3	1/4	2	27	3	1/4	2	144 1/2	34
Huron-Michigan 2½	4		1 1/4	1 11/16									15	3	1/4	2	50	2	1/8	2	121	33
Indiana 12-1½—1920	3	1/4	1			17	1 1/4	14	1 1/4	38 1/2	1		15	3	1/4	2	50	2 1/2	1/8	2	145	33
Indiana 20-2—1920	3	1/4	1 1/4			6	1 1/4	13	1 1/4	26 5/8	1 1/2		17 1/2	2	1/4	4	17 1/2	2	1/4	4	108	32
Indiana 25-2½—1920	3	1/4	1 1/4			6	1 1/4	13	1 1/4	26 5/8	1 1/2		44	2	1/4	2	44	2	1/4	2	126	33
Indiana 35-3½—1920	3	1/4	1 1/4			6	1 1/4	13	1 1/4	26 5/8	1 1/2		51	2 1/4	1/4	2	51	2 1/4	1/4	2	138	33
Indiana 51-5—1920	3	1/4	1 1/2			10	1 1/2	17 1/2	1 1/2	26 5/8	1 1/2		56	2 1/2	1/4	2	56	2 1/2	1/4	2	144	34 1/2
International S-1500 lbs.–Speed Truck '21	3	1/4	1 1/4	1 1/4	V	9 3/4	2 1/4	17 3/4	2 1/4	30 1/4	1	F	68	3	1/4	2	68	3	1/4	2	156	37 1/2
International 21-2000 lbs.—1916–21	3	1/4	1 1/4	1 3/4	V	6	1 1/2	3 1/2	1 1/8	38 1/8	1 1/4	F	38	2	1/4	2	36	2	1/4	2	90	34
International 31-3000 lbs.—1916–21	3	1/4	1 1/4	1 3/4	V	6	1 1/2	3 1/2	1 1/8	38 1/8	1 1/4	F	43 3/4	2 1/4	1/8	2	43 3/4	2 1/4	1/8	2	75 11/16	34
International 41-4000 lbs.—1918–21	3	1/4	1 1/4	1 3/4	V	6	1 1/2	3 1/2	1 1/8	38 1/8	1 1/4	F	43 3/4	2 1/4	1/8	2	43 3/4	2 1/4	1/8	2	88 1/8	34
International 61-6000 lbs.—1918–21	4	1/4	1 1/4	1 3/4	V	6	1 1/2	3 1/2	1 1/8	38 1/8	1 1/8	F	50 5/8	2 1/4	1/8	2	50 5/8	2 1/4	1/8	2	91 1/2	34
International 101-10,000 lbs.—1920-21	4	1/4	1 1/4	1 3/4	V	9	2 1/4	14 1/2	2				50 5/8	2 1/4	1/8	2	50 5/8	2 1/4	1/8	2	118 11/16	34
Jackson B 3½	3	1/4	1 1/4	1 1/2	V	9	2 1/4	14 1/2	2				73 1/16	2 1/2	1/4	2	73 1/16	2 1/2	1/16	2	147 5/8	34
J and J D-2—1920	3	1/4	1 1/2	5/8	V					32 1/2	1 1/4	F	58 1/2	3 1/2	1/4	2					150	36
Jumbo 15-1½—1919	4	1/4		1	V	13	1 3/4	15	1 1/4	33	1 1/4	F	50	3	1/4	2	50	2 1/2	1/4	1	80	32
Jumbo 20-2—1919	4	1/4		1	V	12 1/2	1 3/4	18	1 1/4	33 3/8	2	F	48 1/2	2	1/8	2	47	1 1/2	1/8	2	120	32
Jumbo 25-2½—1917–19	3	1/4		1	V	12 1/2	1 3/4	18	1 1/4	33 3/8	2	F	48 1/2	2	1/8	2	47	1 1/2	1/8	2	120	32
Jumbo 30-3—1917-19	3	1/4		1 1/4	V	12	2	10	1 1/4	33 1/4	1 1/4	F	49 3/4	3	1/8	2	47 1/2	2 1/2	1/8	2	116	34
Jumbo 35-3½—1919	4	1/4		1 1/4	V	12	2	10	1 1/4	33 1/4	1 1/4	F	49 3/4	3	1/8	2	47 1/2	2 1/2	1/8	2	116	34
Jumbo 40-4—1919	4	1/4		1 1/4	V	17 3/4	2	21 1/2	1 1/4	36 1/8	2	F	60 1/2	3	1/8	2	58 1/2	2 1/2	1/8	2	144	36
Kalamazoo G-1½–2	3	1/4	1 1/8	1 1/8		15 1/2	1 1/2	8	1 1/4	36 1/8	2	F	60 1/2	3	1/8	2	58 1/2	2 1/2	1/8	2	144	36
Kalamazoo H-2½	3	1/4	2 1/16	1 1/8		20	1 3/4	19 1/2	1 1/2	40	1 1/2	F	50	2 1/2	1/8	1		2 1/2	1/8	1	144	36
Kalamazoo K-3½	3	1/4	2 1/16	1 1/8		20	1 3/4	19 1/2	1 1/2	42	2	F	90	2 1/2	1/8	1	48	2 1/2	1/8	1	120	32 1/2
Kankakee-2½—1919–20	3	1/8	1 1/8	1 1/8		20	1 3/4	19 1/2	1 1/2	42	2	F	60	2 1/2	1/8	1	60	2 1/2	1/8	1	144	33
Karavan A-2½	4	1/4	1 11/16	1 11/16	H	12 3/4	1 1/2	11	1 1/4	40	3/4	F	60	2 1/2	1/8	1	60	2 1/2	1/8	1	152	36
Kearns H-3¼	4	1/4	1 11/16	1 11/16		11	2 1/4	18	1 1/4	34	2	F	50	3	1/4	1	46 1/2	2	1/8	1	148	32
Kearns N-1½	3	1/8	1	1/8	V	12	2	12	2	36	3/4	F	51	2 1/4	1/8	1	51	2 1/4	1/8	1	132	33
Kelly-Springfield K31 1½	3	1/8	1	1/8	H	18	2	18	2	33	1	F	42	2	1/8	1	21	2	1/8	2	90	34
Kelly-Springfield K34 1½	4	1/4	1	1/8	V	7	1 1/2	13	1 1/2	54 1/2	1	F	45	2 1/2	1/8	1	22	2 1/4	1/8	2	120	34
Kelly-Springfield K35 2½	4	1/4	1	1/8	V	7	1 1/2	13	1 1/2	54 1/2	1	V	16 3/4	1 7/8	1/8	4	16 3/4	1 7/8	1/8	4	141	34
Kelly-Springfield K36 2½	4	1/4	1	1/8	V	7	1 11/16	13	1 3/4	55 1/2	1	V	42 5/8	2	1/4	2	42 5/8	2	1/4	2	141	34
Kelly-Springfield K40 3½	4	1/4	1 1/4	1/8	V	7	1 11/16	13	1 3/4	55 1/2	1	V	16 3/4	1 7/8	1/4	4	16 3/4	1 7/8	1/4	4	141	34
Kelly-Springfield K41 3½	4	1/4	1 1/4	1/8	V	7	1 5/8	23	1 1/2	62 1/8	1	V	48 1/8	2 1/4	1/4	4	48 7/8	2 1/4	1/4	2	141	34
Kelly-Springfield K42 3½	4	1/4	1 1/4	1/8	V	7	1 5/8	23	1 1/2	62 1/8	1	V	21	2 7/8	1/4	4	21	2 3/4	1/4	4	145	38
Kelly-Springfield K 50 5	4	1/4	1 1/4	1/8	V	2	1 5/8	23	1 1/2	62 1/8	1	V	3 1/16	4 1/2	1/4	12	58	2 1/2	1/8	2	144	36
Kelly-Springfield K60-6	4	1/4	1 1/4	1/8	V	8	1 11/16	23	1 1/2	60 5/8	1	V	27 1/2	2 3/4	1/4	8	27 1/2	2 3/4	1/4	4	144	36
Keystone 40-2—1919–20	4	1/4	1 1/4	1/8	V	8	1 11/16	23	1 11/16	60 5/8	1	V	21	2 7/8	1/4	4	21	2 7/8	1/4	4	145	38
Kimball AB-2	3	1/4	1	1/8	V	8	2 1/8	8	2 1/8	38	1	F	21	2 7/8	1/4	4	21	2 7/8	1/4	4	145	38
Kimball AC-2½	3	1/4	1 1/4	1 3/4	V					39	2	F	50 1/2	3	1/4	1	46 3/4	2	1/4	1	124	33
Kimball AK3	3	1/4	1 1/4	1 3/4	V					39	2	F	50	2 1/4	1/4	4	33	3 1/2	1/4	1	135	34
Kimball AF-4	3	1/4	1 1/4	1 3/4	V					39	2	F	52	2 1/2	1/4	4	33	3 1/2	1/4	1	152	34
Kimball AF-5	3	1/4	1 1/2	1 3/4	V					42	2	F	52	2 1/2	1/4	4	33	3 1/2	1/4	1	152	34
King-Zeitler 1½—1919–20	3	1/8	1	1 1/4						42	2	F	58	3	1/4	2	58	3	1/4	2	171	36
King-Zeitler 2½—1919–20	3	1/8	1	1 1/4									65	3	1/4	2	65	3	1/4	2	171	36
King-Zeitler 3½—1919–20	3	1/8	1	1 1/4									48	3 1/4	1/4	4	48	3 1/4	1/4	4	Opt	32
Kissel-1 Ton—1921	3	1/8	1 1/4	1 1/4									54	3 1/2	1/4	4	54	3 1/2	1/4	4	Opt	32
Kissel-Utility 1½—1917–20	3	1/8		1 1/4		12 1/4	1 3/4	10	1 1/2	46 3/4	2	F	64	3 3/4	1/4	4	63	3 3/4	1/4	4	Opt	36
Kissel-Freighter-2—1917–20	3	1/8		1 1/4		12 1/4	1 3/4	10	1 1/2	46 3/4	2	F	11	3	1/4	4	11	3	1/4	4	101 1/4	34
Kissel-Heavy-Duty-3½—1917–20	3	1/8		1 1/4		12 1/4	1 3/4	10	1 1/2	49	2	F	19	2	1/4	4	19	2	1/4	4	120	34
Kissel-Goliath-5—1919–20	3	1/8		1 1/4		13 3/4	1 3/4	10	1 1/2	52 1/4	2	F	14	3 1/2	1/4	4	14	3 1/2	1/4	4	144	34
Kleiber 1	3	1/8	1 1/4	1 3/4						55	2	F	56	2 1/2	1/8	2	56	2 1/2	1/8	2	156	36
Kleiber 1½	3	1/8	1 1/4	1 3/4		13	1 1/2	16	1 1/4	36	3/4		56	2 1/2	1/8	2	56	2 1/2	1/8	2	168	36
Kleiber 2	3	1/8	1 1/4	1 3/4		13	1 1/2	16	1 1/4	38	1 1/4		12	3 1/2	1/4	4	12	3 1/2	1/4	4	120	34
Kleiber 2½	3	1/8	1 1/4	1 3/4		13	1 1/2	16	1 1/4	40	1 1/4		45	2	4	2	45	2	1/4	2	132	34
Kleiber 3½	3	1/8	1 1/4	1 3/4		13	1 3/4	16	1 1/4	40	1 1/4		13 1/2	3 1/2	4	4	13 1/2	3 1/2	1/4	4	144	34
Kleiber 5	3	1/8	1 1/4	1 3/4		13	1 3/4	16	1 1/4	40	1 1/4		52	2 1/4	4	2	52	2 1/4	1/4	2	150	34
Koehler D-1½	4	1/4	1 1/2	1 3/4		13	1 3/4	16	1 1/4	43	1 1/4		16	3 3/4	4	4	16	3 3/4	1/4	4	156	38
Koehler M-2½	3	1/8	1	1/4	V	9 1/4	2	12 1/2	2	37 1/2	1 1/4		18	4	4	4	18	4	1/4	4	168	38
Koehler MCS-2½	4	1/8	1 1/4	1/8	V	5 1/4	1 5/8	5 1/4	1 1/4	40 1/4	1 1/4		40	1 3/4	1/8	2	40	1 3/4	1/8	2	113 1/4	34
Koehler F-3½	4	1/8	1 1/4	1/8	V	5 1/4	1 5/8	5 1/4	1 1/4	40 1/4	1 1/4		13	3 1/2	1/4	4	13	3 1/2	1/4	4	141 3/4	34
Koehler MT 5–Tractor 5	4	1/8	1 1/4	1/8	V	9	1 5/8	5 1/4	1 1/4				13	3 1/2	1/4	4	13	3 1/2	1/4	4	129 3/4	34
Lange 2	3	1/8	1	1/8	V	5 1/4	1 5/8	5 1/4	1 1/4	40 1/4	1 1/4		15 1/2	3 3/4	1/4	4	15 1/2	3 3/4	1/4	4	139 1/2	34
Larrabee-Deyo U-1½ - 1919–20	3	1/8	1	1 5/8	V	3 1/2	2 1/4	11	2	36 1/2	3/4	F	13	3 1/2	1/4	4	13	3 1/2	1/4	4		34
Lar-Deyo A,B 18-19 & L-'20-3½	3	1/8	1		V	9	2	9	2	38	5/8	V	30	2	1/4	2	18	3	1/4	4	114	37
Lar.-Deyo C,D'18-19 & K'20-2½	3	1/8	1 1/4		V	9	1 1/2	6	1 1/4	36	1 1/2		48	2	1/4	2	48	2	1/4	2	108	34
Larrabee-Deyo W-5—1920	3	1/8	1 1/4		V	8 1/2	2	17 1/2	2	44	2	F	60	2 1/2	1/4	2	60	2 1/2	1/4	2	168	36
	3	1/8	1 1/2		V	6	1 1/4	6	1 1/4	36	1 1/4	F	54	2 1/4	1/4	2	54	2 1/4	1/4	2	150	36
													72	3	1/4	2	72	3	1/4	2	152	36

Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING								FRAME	
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Larrabee Deyo T--1918–19	3	3/16	1 1/4	....	V	9	1 1/2	6	1 1/4	36	1 1/2	F	72	3	1/4	2	72	3	1/4	2	157	36
L. M. C.-2½—1919–20	3	1/16	1 1/16	1 3/8	V	10	1 1/2	14	1 1/4	35	1 1/4	F	55	3	1/16	2	50 1/2	2	1/16	2	143	32
Lombard 140 H.P	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	120	79
Lombard 50 H.P	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	79	64
Luedinghaus K2—1919–20	3	1/4	1 1/4	1 11/16	....	9	1 1/4	5	1 1/4	.....	1 1/2	F	53.4	2 1/2	1/4	2	38 1/2	2 1/2	1/4	2	120	34
Luedinghaus K2-LS—1920	3	1/4	1 1/4	1 11/16	....	9	1 1/4	5	1 1/4	.....	1 1/2	F	53.4	2 1/2	1/4	2	38 1/2	2 1/2	1/4	2	145 1/2	34
Luverne BBL-2	3	1/16	1 1/4	1 1/4	....	....	....	....	....	....	....	....	....	2 1/2	1/4	2	....	2 1/2	1/4	2	108	34
Maccar L-1½—1915–20	3	1/16	1 1/4	3/8	V	3 1/4	1 1/2	10	1 1/4	30 3/4	3/4	F	11 1/16	3 1/4	1/4	4	11 1/16	3 1/4	1/4	4	128 1/8	34
Maccar H-2½—1915–20	3	1/16	1 1/4	3/8	V	3 1/2	1 3/4	13	1 1/4	30 3/4	3/4	F	13	3 1/2	1/4	4	13	3 1/2	1/4	4	143 3/8	34
Maccar M2-3½–1920	3	1/16	1 1/4	3/8	V	8	1 3/4	13 1/2	1 1/2	37 1/2	2	F	15 1/8	3 3/4	1/4	4	15 1/8	3 3/4	1/4	4	155 7/8	34
Maccar G-5—1919–20	3	1/4	1 1/2	3/8	V	10 1/2	2	20 1/2	2	40 3/4	2	F	17 3/4	4	1/4	4	17 3/4	4	1/4	4	167	37 1/2
Mack AB1½, 2-Ton-Chain '16-20	4	1/16	1 1/4	1/4	....	9 1/2	1 1/2	4 3/4	1 1/2	33	1 1/2	F	12 1/4	4	1/4	2	16 1/2	2 1/2	1/4	4	Opt	33 1/4
Mack Dual Reduction 1921	4	1/16	1 1/4	1/4	....	9 1/2	1 1/2	4 3/4	1 1/2	33	1 1/2	F	18 1/4	3 1/2	1/4	4	12	6	1/4	2	Opt	33 1/2
Mack AB-Tractor 5 Ton—16–20	4	1/16	1 1/4	1/4	....	9 1/2	1 1/2	4 3/4	1 1/2	33	1 1/2	F	12 1/4	4	1/4	2	16 1/2	2 1/2	1/4	4	77	33 1/2
Mack AC 3½ to 7½ ton—'16–20	4	1/4	1 1/2	1/4	....	5 3/4	2 1/4	4 3/4	1 1/2	.....	1	V	16 1/8	3	1/4	4	20 1/2	3 1/2	1/4	4	Opt	37 1/2
Mack AC Trac. 7 to 15 Ton—'16–20	4	1/4	1 1/2	1/4	....	5 3/4	2 1/4	4 3/4	1 1/2	.....	1	V	16 1/8	3	1/4	4	20 1/2	3 1/2	1/4	4	87	37 1/2
Master JI-1½—1919–20	3	1/16	1 1/4	2	H	13 1/2	2	12 1/2	1 1/4	30 1/2	1	F	74 1/2	2 1/2	1/8	1	74 1/2	2 1/4	1/4	1	117 3/4	34 1/8
Master JW-1½—1919–21	3	1/16	1 1/4	2	H	13 1/2	2	12 1/2	1 1/4	30 1/2	1	F	12	3 1/4	1/4	2	12	3 1/4	1/4	2	117 3/4	34 1/2
Master M-2½—1916–20	3	1/4	1 1/4	2	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	74 1/2	2 1/2	1/8	1	74 1/2	2 1/4	1/4	1	117 3/8	34
Master O 2½—1917–20	3	1/4	1 1/4	2	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	74 1/2	2 1/2	1/8	1	74 1/2	2 1/4	1/4	1	156 3/8	34
Master W-2½—1916–21	3	1/4	1 1/4	2	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/4	3 1/2	1/4	2	13 1/4	3 1/2	1/4	2	117 3/8	34
Master WL 2½—1917–21	3	1/4	1 1/4	2	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/4	3 1/2	1/4	2	13 1/4	3 1/2	1/4	2	156 3/8	34
Master D-2½—1920	3	1/4	1 1/4	2	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	8 5/8	4 1/2	1/16	2	54 1/16	3	1/16	2	117 3/8	34
Master DL-2½—1920	3	1/4	1 1/4	2	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	8 5/8	4 1/2	1/16	2	54 1/16	3	1/16	2	156 3/8	34
Master T-6 Tractor—1917-20	3	1/4	1 1/4	2	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	74 1/2	2 1/2	1/8	1	74 1/2	2 1/4	1/4	1	72 1/8	34
Master A-3½—1918–21	4	1/4	1 1/2	1 3/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	16	3 3/4	1/4	2	16	3 3/4	1/4	2	147 3/4	36 3/4
Master AL-3½—1918–21	4	1/4	1 1/2	1 3/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	16	3 3/4	1/4	2	16	3 3/4	1/4	2	183 3/4	36 3/4
Master E-3½—1920	4	1/4	1 1/2	1 3/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	11	6	1/4	2	25	4	1/4	4	147 3/4	36 3/4
Master EL-3½—1920	4	1/4	1 1/2	1 3/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	11	6	1/4	2	25	4	1/4	4	183 3/4	36 3/4
Master-B 5—1919–21	4	1/4	1 1/2	1 3/4	H	13 1/2	2	15	1 1/2	35	2	F	18	4	1/4	2	18	4	1/4	2	162 7/8	39
Master BL-5—1919–21	4	1/4	1 1/2	1 3/4	H	13 1/2	2	15	1 1/2	35	2	F	18	4	1/4	2	18	4	1/4	2	186 7/8	39
Master F-5—1920	4	1/4	1 1/2	1 3/4	H	13 1/2	2	15	1 1/2	35	2	F	11	6	1/4	2	25	4	1/4	4	162 7/8	39
Master FL-5—1920	4	1/4	1 1/2	1 3/4	H	13 1/2	2	15	1 1/2	35	2	F	11	6	1/4	2	25	4	1/4	4	186 7/8	39
Maxwell 1½—1917–20	3	1/16	1	1	....	....	....	....	....	....	....	....	16	1 3/4	1/16	4	16	1 3/4	1/16	4	102	36
Menominee HT-1—1918–20	3	1/4	1	1 1/2	....	....	....	....	....	....	....	....	12	3 1/4	1/4	8	.....	.....	.....	.....	104	32
Menominee H-1½—1916–20	3	1/4	1 1/4	1 3/4	....	....	....	....	....	....	....	....	13 1/2	3 1/2	1/4	8	.....	.....	.....	.....	122	32
Menominee D-2—1915–20	3	1/4	1 1/4	1 3/4	....	....	....	....	....	....	....	....	13 1/2	3 1/2	1/4	8	.....	.....	.....	.....	146	32
Menominee G-3½—1916–20	3	1/4	1 1/2	2	....	....	....	....	....	....	....	....	16	3 1/2	1/4	8	.....	.....	.....	.....	149	36
Menominee J-5—1917–20	3	1/4	1 1/2	2	....	....	....	....	....	....	....	....	18 1/2	4	1/4	8	.....	.....	.....	.....	149	38
Menominee Ht-1—1920-late	3	1/4	1	1 1/2	....	9 1/4	1 3/4	10 1/2	1 1/4	33 3/4	1 1/4	F	47 1/16	2 1/2	1/16	2	33 1/4	2 1/2	1/16	2	102 3/4	32
Menominee H-1—1920-late	3	1/4	1	1 3/4	....	9 1/4	1 3/4	10 1/2	1 1/4	33 3/4	1 1/4	F	47 1/16	2 1/2	1/16	2	33 1/4	2 1/2	1/16	2	124	32
Menominee D-2—1920-late	3	1/4	1 1/4	1 3/4	....	3	1 3/4	3	1 1/2	37 3/4	2	F	57 1/2	2 1/2	1/16	2	42 1/2	2 1/2	1/16	2	131 1/2	32
Menominee G-3½—1920-late	3	1/4	1 1/4	1 3/4	....	3	1 3/4	3	1 1/2	37 3/4	2	F	57 1/2	2 1/2	1/16	2	42 1/2	2 1/2	1/16	2	149	36
Menominee J-5—1920 late	3	1/4	1 1/2	2	....	3	1 3/4	3	1 3/4	40 3/4	2	F	69 1/16	3 1/2	1/16	2	52	2 1/2	1/16	2	149	38
Moreland 20N—1919–20	3	1/16	1	1 1/2	....	....	....	....	....	....	....	....	11	3	1/4	4	11	3	1/4	4	120	34
Moreland 20B-1½—1919–20-21	3	1/16	1 1/4	1 1/2	....	....	....	....	....	....	....	....	12	3 1/2	1/4	4	12	3 1/4	1/4	4	132	34
Moreland 20C-2½—1919–20-21	3	1/16	1 1/4	1 3/4	....	....	....	....	....	....	....	....	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	160	34
Moreland 20G-4—1919–20-21	3	1/4	1 1/2	1 3/4	....	....	....	....	....	....	....	....	16	3 3/4	1/4	4	16	3 3/4	1/4	4	168	38
Moreland 20J-5—1919–20-21	3	1/4	1 1/2	1 3/4	....	....	....	....	....	....	....	....	18	4	1/4	4	18	4	1/4	4	168	38
Mutual 2B—1919–20	3	1/4	1 1/16	1 1/4	V	19	1 3/4	17	1 1/2	37 5/8	2	F	51	2 1/4	1/4	2	51	2 1/4	1/4	2	128 3/4	34
Mutual 2BP—1919–20	3	1/4	1 1/16	1 1/4	V	19	1 3/4	17	1 1/2	37 5/8	2	F	51	2 1/4	1/4	2	51	2 1/4	1/4	2	128 3/4	34
Napoleon 9-1—1919–20	3	1/4	1	1/16	V	6	2 1/4	12	2	36	1	F	44	2	1/16	1	30	2 1/2	1/16	1	101	35 3/4
Napoleon 11-1½—1919–20	3	1/4	1	1/16	V	6	2 1/4	12	2	36	1	F	49	2	1/16	1	30	2 1/2	1/16	1	101	35 3/4
Nash 2018-1—1919–20	4	1/4	1 1/4	1 1/4	....	3	1 1/2	7 3/4	1 1/4	36	1	F	49 1/8	2	1/16	2	20 1/16	2 1/2	1/16	1	104 1/2	30 1/2
Nash 3018-2—1919–20	4	1/4	1 1/4	1 1/4	....	3	1 1/2	.....	.....	44	1	F	50 5/8	3	1/4	2	20 1/16	2 1/2	1/16	1	118 1/4	31 5/8
Nash 4017-2—1919–20	3	1/4	1 1/4	1 1/4	....	7	1 1/2	.....	.....	44	2	F	49 1/4	2 1/2	1/4	4	25 1/16	2 1/2	1/4	1	117 1/4	38 1/4
Nelson & LeMoon F1	3	1/16	1 1/4	1/16	....	....	....	....	....	....	....	....	12	3 1/4	1/4	2	12	3 1/4	1/4	2	Opt	.....
Nelson & LeMoon F1½	3	1/16	1 1/4	1/16	....	....	....	....	....	....	....	....	12	3 1/4	1/4	2	12	3 1/4	1/4	2	Opt	.....
Nelson & LeMoon F2	3	1/16	1 1/4	1/16	....	....	....	....	....	....	....	....	12	3 1/4	1/4	2	12	3 1/4	1/4	2	Opt	.....
Nelson & LeMoon F3½	3	1/4	1 1/4	1/16	....	....	....	....	....	....	....	....	16 1/2	3 3/4	1/4	2	16 1/2	3 3/4	1/4	2	Opt	.....
Nelson & LeMoon F5	4	1/4	1 1/2	1/16	....	....	....	....	....	....	....	....	18	4	1/4	2	18	4	1/4	2	Opt	.....
Netco D-2	3	1/16	1 1/4	1 1/16	V	6 1/2	1 1/2	13 1/2	1 1/4	28 1/8	1 1/4	F	13	3 1/2	1/4	4	12	3 1/2	1/4	4	144	34 1/4
Netco H-2½	3	1/16	1 1/4	1 1/16	V	9	1 1/2	16	1 1/4	30 1/8	1 1/2	F	13	3 1/2	1/4	4	13	3 1/2	1/4	4	140	34 1/4
Niles E-2	3	1/16	1 3/4	1 3/4	V	8	1 1/4	11	1 1/4	30	3/4	F	12	3 1/4	1/4	2	12	3 1/4	1/4	2	147	.....
Noble B30-1½—1918–20	4	1/16	1	1 1/16	....	16 1/2	1 1/4	7	1 7/8	34 1/4	1 1/16	....	43	2	1/4	2	43	2	1/4	2	136	34
Noble C40-2—1919–20	4	1/4	1 1/4	1 1/16	....	12	1 1/4	9	2	34 1/4	1 1/16	....	43	2	1/4	2	43	2	1/4	2	148	34
Noble D50-2½—1919–20	4	1/4	1 1/4	1 1/16	....	12	1 1/4	9	2	34 1/4	1 1/16	....	51	2 1/4	1/4	2	51	2 1/4	1/4	2	172	34
Noble E70-3½—1919–20	4	1/4	1 1/4	1 1/16	....	16	1 1/4	14 1/2	2	34 1/4	1 1/8	....	57	2 1/2	1/4	2	57	2 1/2	1/4	2	172	36
Northway B-2	3	1/16	1 1/4	1 1/16	V	5 1/4	2 1/4	13 1/8	1 1/4	31	5/8	V	50 1/2	2 1/4	1/4	2	50 1/2	2 1/4	1/4	2	118	33
Northway B-3	3	1/16	1 1/16	1 3/4	V	5 1/4	2 1/4	13 1/8	1 1/4	31	5/8	V	54	2 1/2	1/4	2	54	2 1/2	1/4	2	173	34 1/8
Norwalk 35E Special	3	1/16	1/16	1/16	V	11 1/2	2	18	1 3/8	37	2	F	17	2 1/4	1/4	2	17	1 1/2	1/16	2	123	34 1/4
O. K.-1½—1920	4	1/4	1 1/4	1 11/16	V	12	2	13 1/2	1 1/4	36	2	F	53	2 1/2	1/16	2	38	2 1/2	1/16	2	117	34
O. K.-2½—1920	4	1/4	1 1/4	1 11/16	V	12	2	13 1/2	1 1/4	36	2	F	62	2 1/2	1/16	2	48	2 1/2	1/16	2	121	35
O. K. 3½—1920	4	1/4	1 1/4	1 11/16	V	12	2	13 1/2	1 1/4	38	2	F	62	2 1/2	1/16	2	48	2 1/2	1/16	2	133	34
Old Hickory W-1—1919	3	1/16	1 3/8	1	....	7	2	11 1/2	2	37 1/2	3/4	V	24	2 1/4	1/4	2	24	2 1/4	1/4	2	120	36
Old Reliable A-1½—1918–20-21	3	1/4	1 1/4	1 1/4	....	....	....	....	....	....	....	....	48	2 1/2	1/4	1	48	2 1/2	1/4	1	105	32
Old Reliable B-2½—1918–20-21	3	1/4	1 1/4	1 1/4	....	....	....	....	....	....	....	....	54	2	1/4	1	54	2	1/4	1	144	32
Old Reliable C-3½—1918–20-21	3	1/4	1 1/4	1 1/4	....	....	....	....	....	....	....	....	60	2 1/2	1/4	1	60	2 1/2	1/4	1	150	32
Old Reliable D-5—1918–20-21	3	1/4	1 1/2	1 1/2	....	....	....	....	....	....	....	....	72	3	1/4	1	72	3	1/4	1	156	34
Old Reliable K. L. M.-7—1918-20-21	3	1/4	1 1/2	1 1/2	....	....	....	....	....	....	....	....	54	3 1/2	1/4	1	60	4	1/4	1	158	36
Oldsmobile T-1—1921	3	1/16	1 1/16	1 3/8	V	5	1 1/4	11	1 1/4	32 3/8	.....	V	42 1/4	2	1/2	1	41 1/16	2	1/2	1	92 5/8	34
Oneida A 9-1¼	3	1/16	1	....	H	7 1/2	1 1/4	9 1/2	1 1/4	36	2	....	48	2 1/2	1/16	2	34	2 1/2	1/16	2	106	34
Oneida B 9-1¾	3	1/16	1 1/4	....	H	9 1/2	1 1/4	9 1/2	1 1/4	38 1/2	2	....	48	2 1/2	1/16	2	34	2 1/2	1/16	2	114	34
Oneida C 9-2½	3	1/16	1 1/4	....	H	9 1/4	1 1/4	9 1/2	1 1/4	38 1/2	2	....	58	2 1/2	1/16	2	43	2 1/2	1/16	2	138	34
Oneida D 9-3½	3	1/4	1 1/4	....	H	7	1 1/2	9 1/2	1 1/2	40	2	....	16	4	1/16	4	16	4	1/16	4	157	36
Oneida E 9-5	3	1/4	1 1/4	....	H	7 1/2	1 3/4	9 1/2	1 1/2	40	2	....	18	4	1/16	4	18	4	1/16	4	177	38
Oshkosh A-2	3	1/16	1 1/4	2	....	....	....	....	....	....	....	....	23 5/8	3	1/4	1	43 1/16	2 1/2	1/16	2	108 5/8	34
Oshkosh AA-2	3	1/16	1 1/4	2	....	....	....	....	....	....	....	....	23 5/8	3	1/4	1	43 1/16	2 1/2	1/16	2	143 5/8	34
Packard EC	3	1/4	1 5/8	1 3/4	V	6 1/4	1 1/2	10 3/8	1 1/2	41 1/16	3/4	V	7 1/16	4 3/4	1/4	2	14	2	1/16	4	132	31 1/4
Packard ED	3	1/4	1 5/8	1 3/4	V	6 1/4	1 1/2	10 3/8	1 1/2	43 1/16	3/4	V	9 1/16	4 3/4	1/4	2	18 3/4	3	1/16	4	144	39
Packard EF	3	1/4	1 5/8	1 3/4	V	6 1/4	1 1/2	10 3/8	1 1/2	43 1/16	3/4	V	9 1/16	6 1/2	1/4	2	18 3/4	3 1/2	1/16	4	144	39
Packard EX	3	1/4	1 5/8	1 3/4	V	6 1/4	1 1/2	10 3/8	1 1/2	43 1/16	3/4	V	9 1/16	6 1/2	1/4	2	14	2	1/16	4	132	31 1/4
Paige 54-20-2½	3	1/4	....	1 1/4	....	10 1/2	1 1/2	10 1/2	1 1/2	37 5/8	1 1/4	F	49 5/8	2 1/4	1/4	2	49 5/8	2 1/4	1/4	2	126	33
Paige 51-18-3½	3	1/4	....	1 1/4	....	13	1 1/2	13	1 1/2	37 5/8	2	F	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	144	35
Paige 52-19-1½	3	1/16	....	1 1/4	....	8	1 1/4	12	1 1/4	36	2	F	11 1/2	3 1/4	1/4	4	11 1/2	3 1/4	1/4	4	126	33
Parker F20-2—1920	3	1/4	1 1/4	1 1/2	V	19	1 3/4	16 1/2	1 1/2	38	2	F	10 3/4	5	1/4	2	19	2 1/2	1/4	4	127	33
Parker J20-3½-- 1920	3	1/4	1 1/4	1 1/2	V	19	1 3/4	16 1/2	1 1/2	38	2	F	10 3/4	5	1/4	2	19	3 1/2	1/16	4	139 1/2	33
Parker M20-5—1920	3	1/4	1 1/2	1 3/4	V	14	1 3/4	18	1 3/4	39 1/2	2	F	10 3/4	5	1/4	2	24 1/2	4	1/4	4	145	37
Patriot Lincoln 2	3	1/16	1 1/16	1 11/16	....	9	1 1/4	11 1/2	1 1/4	36 1/16	2	F	41	1 3/4	1/4	2	41	1 3/4	1/4	2	112	34
Patriot Revere-1	3	1/16	1 1/16	1 1/16	....	7 3/4	2	8 3/4	2	38	1 1/4	F	41	1 3/4	1/4	2	41	1 3/4	1/4	2	92 1/2	33 1/4
Patriot Washington-3	3	1/4	1 1/16	1 11/16	....	10	1 1/2	12	1 1/2	38 3/4	2	F	55	2 1/4	1/4	2	55	2 1/4	1/4	2	150	34
Pierce Arrow-2-X-5	3	1/16	1 1/16	1 5/8	V	16 3/8	2	14 1/4	1 3/8	43 1/2	1 1/2	F	22 1/4	2 1/4	1/4	4	22 1/4	2 1/4	1/4	4	125 1/16	34 1/8

Replacement Table—Continued

Name, Model and Tonnage	ENGINE												BRAKE LINING								FRAME	
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Pierce Arrow-3½-W-2	3	1/4	1 11/16	1 7/16	V	11	2	15½	1¾	43½	1½	F	9 11/16	6	1/4	2	18	4¾	1/4	4	133¼	38⅛
Pierce Arrow-5-R-10	3	1/4	1 11/16	1 7/16	V	11	2	15½	1¾	43½	1½	F	9 11/16	6	1/4	2	20⅞	4¾	1/4	4	139¼	38⅛
Pittsburgher 2½— 1919–20	3	1/4	1¼	1¼	V	6	1½	12	1¼	37	1	F	52	2¼	1/4	2	52	2¼	1/4	2	136	33
Rainier R-8-2	3	1/4	1 1/16	1/4	V	5	1½	13	1½	31½	1¼	F	44½	2	1/4	1	44½	2	1/4	1	.....	34
Rainier R6-1½	3	1/4	1 1/16	1/4	V	9¾	1½	14¾	1½	41	1½	F	19	2	1/4	2	19	2	1/4	2	113	34
Rainier R-19-1	3	1/4	1 1/16	1/4	V	8½	1½	14	1½	41	1½	F	19	2	1/4	2	19	2	1/4	2	100	34
Rainier R11-¾	3	1/4	1 1/16	1/4	V	9	1½	14½	1½	42	1½	F	11¼	3	1/4	2	11¼	3	1/4	2	90	34
Ranger TK-20-2	3	1/4	1 1/16	1½	....	.....	.....	.....	.....	.....	.....	.....	11½	3¼	1/4	2	11½	3¼	1/4	2	106½	33
Reliance 10A-1½—1920	4	1/4	1¼	3/8	V	10½	2	13½	1⅜	35	2	F	17	2	1/4	4	17	2	1/4	4	122	32
Reliance 20B-2½—1920	4	1/4	1¼	3/8	V	10½	2	13½	1⅜	35	2	F	17	2	1/4	4	17	2	1/4	4	127	32
Reo F—1500-2500-lbs	3	1/4	1	1	V	5½	1	5½	1	39 1/4	7/8	F	43	2¼	1/4	1	39⅝	2	1/4	1	82	30
Republic 10-1-10E-1-1919–20–21	3	1/4	1	....	V	12¾	2	6	2	40 1/4	1¼	F	20¼	2½	1/4	4	19¾	2¼	1/4	4	98	34
Republic 11X-1½—1919–20–21	3	1/4	1	....	V	12¾	2	6	2	40 1/4	1¼	F	54 1/4	2½	1/4	2	24¼	2¼	1/4	4	118	34
Republic 19-2½—1919–20–21	3	1/4	1¼	....	V	8	1½	11¾	1¼	32 1/4	1¼	F	54 1/4	2½	1/4	2	24¼	2¼	1/4	4	121	34
Republic 20-3½—1919–20–21	3	1/4	1¼	....	V	7¼	1¾	11¾	2¾	36¼	1½	F	55¾	3½	1/4	2	30 11/16	4½	1/4	1	146	37
Reynolds 3A-1½	3	1/4	1¼	....	....	.....	.....	.....	.....	.....	.....	.....	46	2	1/4	2	46	2	1/4	2	121	33
Reynolds 5A-2½	3	1/4	1¼	....	....	.....	.....	.....	.....	.....	.....	.....	52½	2¼	1/4	2	52½	2¼	1/4	2	126	33
Reynolds 7A-3½	3	1/4	1¼	....	....	.....	.....	.....	.....	.....	.....	.....	57	2½	1/4	2	57	2½	1/4	2	148	37
Reynolds 10A-5	3	1/4	1¼	....	....	.....	.....	.....	.....	.....	.....	.....	70	3	1/4	2	70	3	1/4	2	148	37
Riker B3, BB-4	5	1/4	.....	.....	....	9¾	1 5/8	8	1¼	49½	1¼	V	7¼	4½	1/4	2	20	4	1/4	4	150	38
Rowe CW-1½—1918–19–20	3	1/4	1¼	1/4	....	10½	1¾	10½	1½	32½	1⅛	F	19	2	1/4	8	19	2	1/4	8	113	33
Rowe CDW2—1916–20	3	1/4	1¼	1/4	....	10½	1¾	10½	1½	32½	1⅛	F	45	2	1/4	4	45	2	1/4	4	123	33
Rowe GSW3—1918–20	3	1/4	1¼	1/4	....	20	1¾	15½	1½	36¼	2	F	51½	2½	1/4	4	51½	2½	1/4	4	140	33
Rowe HW4--1918–20	3	1/4	1¼	1/4	....	20	1¾	15½	1½	36¼	2	F	56½	2½	1/4	4	56½	2½	1/4	4	146	36
Rowe FW5—1914–20	3	1/4	1¼	1/4	....	20	1¾	15½	1½	36¼	2	F	68	3	1/4	4	68	3	1/4	4	153	38½
Rowe GPW3—1916-17, 1919–20	3	1/4	1¼	1/4	....	10	1¼	6	1¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	152	33
Sandow G-1—1918–20	3	1/4	1	1/4	....	.....	.....	.....	.....	.....	.....	.....	20	2	1/4	2	20	2	1/4	2	96	34
Sandow CG-1½1918—20	3	1/4	1	1/4	....	.....	.....	.....	.....	.....	.....	.....	20	2	1/4	2	20	2	1/4	2	120	34
Sandow I-2—1918–20	3	1/4	1	1/4	....	.....	.....	.....	.....	.....	.....	.....	60	3	1/4	1	60	3	1/4	1	132	32
Sandow J-2½—1918–20	3	1/4	1¼	1/4	....	.....	.....	.....	.....	.....	.....	.....	13½	3½	1/4	2	16	3½	1/4	2	144	32
Sandow L-5—1918–20	3	1/4	1¼	1/4	....	.....	.....	.....	.....	.....	.....	.....	24	4½	1/4	2	24	4½	1/4	2	144	37
Sandow M-3½—1918–20	3	1/4	1¼	1/4	....	.....	.....	.....	.....	.....	.....	.....	18½	4	1/4	2	18½	4	1/4	2	144	37
Sanford 25-2½—1917–20	3	1/4	1¼	1¼	....	.....	.....	.....	.....	.....	.....	.....	51½	2¼	1/4	2	51½	2½	1/4	2	144	35
Sanford W35-2½—1917–20	3	1/4	1¼	1¼	....	.....	.....	.....	.....	.....	.....	.....	56	2½	1/4	2	56	2½	1/4	2	145	35
Sanford W50-5—1917–20	3	1/4	1¼	1¼	....	.....	.....	.....	.....	.....	.....	.....	69	3	1/4	2	69	3	1/4	2	145	35
Schacht 2	3	1/4	1¼	....	....	.....	.....	.....	.....	.....	.....	.....	8½	3½	1/4	4	13½	3	1/4	4	140	35¾
Schacht 2½	3	1/4	1¼	....	....	.....	.....	.....	.....	.....	.....	.....	8½	3½	1/4	4	13½	3	1/4	4	140	35¾
Schacht 3½	4	1/4	1¼	....	....	.....	.....	.....	.....	.....	.....	.....	8½	3½	1/4	4	13½	3	1/4	4	152	35¾
Schacht 5	4	1/4	1¼	....	....	.....	.....	.....	.....	.....	.....	.....	8½	3½	1/4	4	15	4	5/16	4	152	35¾
Selden 1½A—1919–20	3	1/4	1	1 1/16	....	12	2	.....	.....	41	1¼	F	11 11/16	3¼	1/4	2	11 11/16	3¼	1/4	4	114	34
Selden 2½A—1920	3	1/4	1	1 1/16	....	3¾	1¼	12	1¼	31	1½	F	13 3/16	3½	1/4	2	13 3/16	3½	1/4	4	134	34
Selden 3½A—1919–20	3	1/4	1¼	1 11/16	....	9	1¾	5½	1¾	34¼	2	F	15¾	3¾	1/4	2	15¾	3¾	1/4	4	153	37½
Selden 5A—1920	3	1/4	1½	1 11/16	....	7	2	20½	2	40 3/8	2	F	18	4	1/4	2	18	4	1/4	4	153	37½
Service 15-1921	3	1/4	1 1/16	1 1/16	....	10	1¾	2	1¼	35	2	F	19⅜	1¾	1/4	4	19⅜	1¾	1/4	4	187¾	37 1/4
Service 220-1—1919–20	3	1/4	1 1/16	1 1/16	....	10	2	6	1¾	37¾	1	F	12	3¼	1/4	2	12	3¼	1/4	2	109½	34
Service 31-1½—1919–20	4	1/4	1 1/16	1 1/16	....	10	2	8	1¼	33	1¼	F	12	3¼	1/4	2	12	3¼	1/4	2	121 1/4	34
Service 36-1½—1919–20	4	1/4	1 1/16	1 1/16	....	10	2	8	1¼	33	1¼	F	12	3¼	1/4	2	12	3¼	1/4	2	121 1/4	34
Service 51-2½—1919–20	4	1/4	1 1/16	1 1/16	....	10	2	8	1¼	33	1¼	F	13½	3½	1/4	2	13½	3½	1/4	2	131⅛	34
Service 71-3½—1919–20	4	1/4	1 11/16	1 1/16	....	10	2	8	1¼	33	1¼	F	16	3¾	1/4	2	16	3¾	1/4	2	150¼	38
Service 76-3½—1919–20	4	1/4	1 11/16	1 1/16	....	10	2	10	1¼	38¼	1½	F	16	3¾	1/4	2	16	3¾	1/4	2	145¾	38
Service 101-5—1919–20	4	1/4	1 11/16	1 1/16	....	10	2	10	1¼	38¼	1½	F	18½	4	1/4	2	18½	4	1/4	2	145¾	38
Signal NF-1	4	1/4	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	11	3	1/4	4	11	3	1/4	4	120	.....
Signal H 1½	3	1/4	1 1/16	1 11/16	....	.....	.....	.....	.....	.....	.....	.....	12	3¼	1/4	2	12	3¼	1/4	2	120	34
Signal J-2½	3	1/4	1 1/16	1 11/16	....	.....	.....	.....	.....	.....	.....	.....	13½	3½	1/4	2	13½	3½	1/4	2	126	34
Signal M 3½	3	1/4	1 1/16	1 11/16	....	.....	.....	.....	.....	.....	.....	.....	16	3¾	1/4	2	16	3¾	1/4	2	168	38
Signal R-5	3	1/4	1 5/8	1 1/8	....	.....	.....	.....	.....	.....	.....	.....	18	4	1/4	2	18	4	1/4	2	172	38
Standard I-K-1	3	1/4	1	1 1/16	....	10½	2 1/16	14¾	1 1/16	.....	1¼	F	10 7/8	3	1/4	4	10 7/8	3	1/4	4	120	32
Standard 76-2½	3	1/4	1¼	1 1/16	....	.....	1 1/8	12	1 5/8	.....	1¼	F	13 1/4	3½	1/4	4	13 1/4	3½	1/4	4	122	32
Standard 66-3½	3	1/4	1¼	1 1/16	....	12	2 1/16	18	1 5/8	.....	1½	F	15 5/8	3¾	1/4	4	15 5/8	3¾	1/4	4	144	38
Standard 5K-5	3	1/4	1½	1 11/16	....	8	2 1/16	3½	2 3/16	2	F	17 11/16	4	1/4	4	17 11/16	4	1/4	4	144	38
Sterling 1½—1920–21	3	1/4	1¼	1/4	V	11	1½	19	1½	32¾	1½	F	11¾	3¼	1/4	4	11¾	3¼	1/4	4	120	33½
Sterling 2— 1920–21	3	1/4	1¼	1/4	V	11	1½	19	1½	32¾	1½	F	13 3/16	3½	1/4	4	13 3/16	3½	1/4	4	120	33½
Sterling 2½—1920–21	3	1/4	1¼	1/4	V	11	1½	19	1½	32¾	1½	F	13 3/16	3½	1/4	4	13 3/16	3½	1/4	4	138	34
Sterling 3½—1920–21	3	1/4	1½	1/4	V	14 5/8	1½	22	1½	40	1½	F	15¾	3¾	1/4	4	15¾	3¾	1/4	4	144	38
Sterling 5-Worm—1920–21	3	1/4	1½	1/4	V	11	1½	19	1½	40	1½	F	17 11/16	4	1/4	4	17 11/16	4	1/4	4	158	38
Sterling 5-Chain—1920–21	3	1/4	1½	1/4	V	11	1½	19	1½	40	1½	F	56½	3½	1/4	2	34 11/16	4	1/4	1	158	38
Sterling 7½—1920–21	3	1/4	1½	1/4	V	11	1½	19	1½	40	1½	F	56½	3½	1/4	2	34 11/16	4	1/4	1	158	38
Stewart M7-2—1918–20	3	1/4	.....	1 1/16	....	.....	.....	.....	.....	.....	.....	.....	50⅝	2	1/4	2	8	5	1/4	2	132¾	32
Stewart M15-1—1920	3	1/4	.....	1	....	.....	.....	.....	.....	.....	.....	.....	41⅜	2	1/4	2	22¾	2	1/4	1	99½	32
Stewart M9-1½—1918–20	3	1/4	.....	1	....	.....	.....	.....	.....	.....	.....	.....	48½	2	1/4	2	8	5	1/4	2	119¼	32
Stewart M10-3½—1918–20	3	1/4	.....	1 3/16	....	.....	.....	.....	.....	.....	.....	.....	60	3	1/4	2	8	5	1/4	2	139¾	32
Stewart M11-¾—1919-20	3	1/4	.....	7/16	....	.....	.....	.....	.....	.....	.....	.....	41⅜	2	1/4	2	22¾	2	1/4	1	77¼	32
Stewart M7X—1920	3	1/4	.....	1 3/16	....	.....	.....	.....	.....	.....	.....	.....	50⅝	2	1/4	2	8	5	1/4	2	132¾	32
Stewart M10X--1920	3	1/4	.....	1 3/16	....	.....	.....	.....	.....	.....	.....	.....	60	3	1/4	2	8	5	1/4	2	138	32
Stoughton A-1	4	1/4	1	1 3/16	V	18	1¼	15	1¼	38½	1¾	F	16	1¾	1/4	4	16	1¾	1/4	4	88	34
Stoughton B-1½	4	1/4	1	1 3/16	V	18	1¼	15	1¼	39¼	1½	F	19	2	1/4	4	19	2	1/4	4	116	34
Stoughton D-2	4	1/4	1¼	1 5/8	V	8½	1½	15	1¼	42	2	F	45	2	1/4	2	45	2	1/4	2	116	34
Stoughton F-3	4	1/4	1¼	1 5/8	V	9½	1¾	15	1¼	42	2	F	52	2¼	1/4	2	52	2¼	1/4	2	127	36
Success B-2½	.....	.....	1 5/8	1/4	....	.....	.....	.....	.....	.....	.....	.....	55	2¼	1/4	1	55	2¼	1/4	1	132	32¼
Super.Truck 50—1920	3	1/4	1¼	1 11/16	V	11	1¾	19	1½	37½	1⅞	F	51½	2¼	1/4	2	51½	2¼	1/4	2	135	34
Super Truck 70—1920	3	1/4	1¼	1 11/16	V	18½	1¾	19	1½	37½	1⅞	F	55½	2½	1/4	2	55½	2½	1/4	2	144	34
Super Truck 100—1920	3	1/4	1½	1 11/16	V	7½	1¾	18½	1¾	42	1⅞	F	68	3	1/4	2	51½	3	1/4	2	144	34
Superior D-1—1919–20	3	1/4	1 1/16	1 1/16	....	11	2	10	2	39	1	F	45	2½	1/4	2	44	2¼	1/4	2	97¾	34
Superior E-2—1919-20	3	1/4	1 1/16	1 11/16	....	8½	1½	15	1¼	29	1	F	54	2½	1/4	2	53½	2½	1/4	2	114	34
Tiffin GW-1½—1920–21	3	1/4	1¼	1¼	V	.....	.....	.....	.....	.....	.....	.....	46	2	1/4	1	46	2	1/4	1	114	35
Tiffin MW-2½—1920–21	3	1/4	1½	1¼	V	.....	.....	.....	.....	.....	.....	.....	52	2¼	1/4	1	52	2¼	1/4	1	138½	32¾
Tiffin PW-3½—1920–21	3	1/4	1¼	1¼	V	.....	.....	.....	.....	.....	.....	.....	58	2½	1/4	1	58	2½	1/4	1	151	35½
Tiffin TW-5—1920–21	3	1/4	1½	1½	V	.....	.....	.....	.....	.....	.....	.....	68	3	1/4	1	68	3	1/4	1	156	38½
Tiffin UW-6—1920–21	3	1/4	1½	1½	V	.....	.....	.....	.....	.....	.....	.....	68	3	1/4	1	68	3	1/4	1	156	38½
Titan 3½—1919	4	1/4	1½	1¾	....	.....	.....	.....	.....	.....	.....	.....	60	2¼	1/4	2	14	4½	1/4	2	144	34
Titan 5-6—1918–20	4	1/4	1½	1¾	....	.....	.....	.....	.....	.....	.....	.....	90	2¼	1/4	2	14	4½	1/4	2	144	34
Titan 2½—1920	4	1/4	1¼	1¼	....	.....	.....	.....	.....	.....	.....	.....	54	2¼	1/4	2	26	4	1/4	1	144	32
Tower J-1½—1920	3	1/4	1¼	1¼	....	.....	.....	.....	.....	.....	.....	.....	11¾	3¼	1/4	4	11¾	3¼	1/4	4	135¼	32½
Tower H-2½—1919–20	3	1/4	1¼	1¼	....	.....	.....	.....	.....	.....	.....	.....	13 1/4	3½	1/4	4	13 1/4	3½	1/4	4	138¾	32½
Tower G-3½—1919–20-21	3	1/4	1½	1½	....	.....	.....	.....	.....	.....	.....	.....	15⅝	3¾	1/4	4	15⅝	3¾	1/4	4	152 11/16	37
Trabold J-2½	3	1/4	1¼	1	....	.....	.....	.....	.....	.....	.....	.....	13	3½	1/4	4	13	3½	1/4	4	Opt	34
Traffic C-4000—1919–20	3	1/4	1	1/4	H	10½	2	10½	2	41¼	1¼	F	43½	2½	1/4	2	38	1¾	1/4	2	120¾	42
Transport 20-1	3	1/4	1	....	V	12	2	12	2	36½	1	F	48⅞	2	1/4	2	45⅞	1½	1/4	2	101	34
Transport 30-1½	3	1/4	1	....	V	10¾	2	13	2	40⅜	1¼	F	48⅞	2½	1/4	2	45⅞	1½	1/4	2	117	34
Transport 50-2½	3	1/4	1¼	....	V	9¼	2	10	1¼	32¾	2	F	50⅝	3	1/4	2	48½	2½	1/4	2	123	34
Transport 70-3½	4	1/4	1¼	....	V	12	2	16	1¼	35⅞	2	F	11½	4	1/4	2	58	2½	1/4	2	150	36½
Traylor B-1½	4	1/4	1¼	1½	V	.....	.....	.....	.....	38	1	F	50	2	1/4	2	50	2	1/4	2	117	34

Replacement Table—Continued

Name, Model and Tonnage	ENGINE												BRAKE LINING								FRAME	
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Traylor C-2	4	1/4	1 1/4	1 1/2	V					36	2	F	50	2	1/4	2	50	2	1/4	2	122	34
Traylor D-3	4	1/4	1 1/4	1 1/2	V					36	2	F	56 1/2	2 1/4	1/4	2	56 1/2	2 1/4	1/4	2	142	34
Traylor E-4	4	1/4	1 1/4		V					37	2	F	59	2 1/2		2	59	2 1/2		2	165	35
Traylor F-5	4	1/4	1 1/4		V					37	2	F	59	2 1/2		2	59	2 1/2		2	165	35
Triangle AA-3/4—1920	3	1/8	1	1	H	17	3	17	3	34	1	F	22	2 1/2	1/8	1	41	2	1/8	2	94	35
Triangle A-1 1/2—1918-20	3	1/4	1	1	V	14	1 1/4	14 1/2	1 1/4	39 1/4	1 1/2	F	7	4	1/8	2	49	2	1/8	2	126	34
Triangle B 2 1/2—1919-20	3	1/4	1 1/4	1 1/4	V	18	1 1/2	18	1 1/2	39 1/4	1 1/2	F	7	4	1/8	2	52	3	1/8	2	132	34
Triangle C-2—1920	3	1/4	1	1	V	14	1 1/4	14 1/2	1 1/4	39 1/4	1 1/2	F	7	4	1/8	2	52	3	1/8	2	129	34
Triumph H-1 1/2	4	1/4			V	9	1 3/4	17	1 1/4	32 1/2	2	F	42	2 1/2	1/8	2	38	1 3/4	1/8	2	120	34 1/2
Triumph HB-2	4	1/4			V	9	1 3/4	17	1 1/4	32 1/2	2	F	46	2 1/2	1/8	2	32	2 1/2	1/8	2	120	34 1/2
Triumph HC-1 1/2	4	1/4			V	9	1 3/4	17	1 1/4	32 1/2	2	F	46	2 1/2	1/8	2	32	2 1/2	1/8	2	120	34 1/2
Twin City 2	3	1/4	1 1/4	2	V	11	2	13	1 1/4	36 3/4	2	F	50	3	1/8	2	48	2 1/2	1/8	2	132	33
Twin City 3 1/2	4	1/4	1 1/4	2	V	8	1 5/8	4	1 5/8	36 1/2	2	F	15	3 3/4	1/4	4	15	3 3/4	1/4	4	156	36
Ultimate A-2—1920	4	1/4	1 1/8	1 5/8	V	11	2	8	1 1/4	34	2	F	45	2	1/4	2	45	2	1/4	2	126	32 3/4
Ultimate AJ2—1920	4	1/4	1 1/8	1 5/8	V	11	2	8	1 1/4	34	2	F	45	2	1/4	2	45	2	1/4	2	126	32 3/4
Ultimate AJL-2-1920	4	1/4	1 1/8	1 5/8	V	11	2	8	1 1/4	34	2	F	45	2	1/4	2	45	2	1/4	2	150	32 3/4
Ultimate B-3—1920	4	1/4	1 1/8	1 5/8	V	11	2	8	1 1/4	34	2	F	51	2 1/4	1/4	2	51	2 1/4	1/4	2	144	32 3/4
Ultimate BL3—1920	4	1/4	1 1/8	1 5/8	V	11	2	8	1 1/4	34	2	F	51	2 1/4	1/4	2	51	2 1/4	1/4	2	192	32 3/4
Union F-2 1/2	3	1/4	1 1/4	1 1/4	V	20	1 3/4	19 1/2	1 1/2	37 3/4	2	F	55	3	1/8	1	50	2	1/8	1	133 1/2	32
Union FW-2 1/2	3	1/4	1 1/4	1 1/4	V	20	1 3/4	19 1/2	1 1/2	37 3/4	2	F	26	4 1/2	1/4	1	52	3	1/4	1	133 1/2	32
Union H-4	3	1/4	1 1/4	1 1/4	V	20	1 3/4	19 1/2	1 1/2	37 3/4	2	F	56 3/4	3 1/2	1/8	1	32	4 1/2	1/8	1	157 1/2	34
Union HW-4	3	1/4	1 1/4	1 1/4	V	20	1 3/4	19 1/2	1 1/2	37 3/4	2	F	26	4 1/2	1/4	1	24	4	1/4	2	157 1/2	34
Union J-6	3	1/4	1 1/2	2	V	20	1 3/4	19 1/2	1 1/2	41 1/2	2	F	34	4	1/4	1	65	3	1/4	1	190	36
Union JW-6	3	1/4	1 1/2	2	V	20	1 3/4	19 1/2	1 1/2	41 1/2	2	F	34	4	1/4	1	28	5	1/4	2	190	36
United 1 1/2			1	1 1/8		15	2 1/2	16	1 1/2	37 1/2	2	F	48	2	1/8	1	48	1 1/2	1/8	1	120	33
United-2 1/2			1 1/4	1 1/8		7	2 1/2	12	1 1/2	37 1/2	2	F	49	3	1/8	1	49	2 1/2	1/8	1	Opt	33
United 3 1/2			1 1/4	1 1/8		7	2 1/2	7	1 1/2	37 1/2	2	F	62	3	1/8	1	58	2 1/2	1/8	1	Opt	34
United 5			1 1/2	1 1/8		14 1/2	2 1/2	12	1 1/2	37 1/2	2	F	88 1/2	2 1/4	1/8	1	88 1/2	2 1/4	1/8	1	Opt	38
U.S.N.-1 1/2	3	1/8	1	1/8	H	11 1/2	2	9	1 1/4	37	1 1/4	F	50	2 1/2	1/8	2	46 1/2	1 1/2	1/8	2	120	34
U.S.R.-2 1/2-3	3	1/8	1 1/4	1/8	V	10	1 1/4	9	1 1/4	35	1 1/4	F	46	2 1/4	1/4	2	46	2 1/4	1/4	2	144	34
U.S.S.-3 1/2-4	3	1/4	1 1/4	1/4	V	9	1 1/2	8	1 1/2	37	1 1/4	F	50	2 1/2	1/4	2	50	2 1/2	1/4	2	156	36
U.S.T.-5-6	3	1/4	1 1/2	1/4	V	15	2	13	1 1/2	38 3/4	2	F	62	3	1/4	4	33	4	1/4	1	168	36
Velie 46-1 1/2—1921	3	1/8	1	1/8	V	9 1/2	2 1/4	12 1/4	1 1/2	40	3/4	V	54 1/8	2 1/2	1/8	2	52 1/8	2 1/4	1/8	2	120	31
Vim 29-1/2	3	1/8	7/8							30	1	F	14 1/2	1 1/2	1/8	4	14 1/2	1 1/2	1/8	4	64	30
Vim 30-1/2	3	1/8	7/8							30	1	F	14 1/2	1 1/2	1/8	4	14 1/2	1 1/2	1/8	4	83 1/2	30
Vim 31-1	4	1/8	1							40	1	F	19	2	1/8	4	19	2	1/8	4	92	32
Vim 22-2	4	1/8								40	1	F	44 1/2	2	1/4	2	44 1/2	2	1/4	2	121 1/4	34
Vim 23-3	5	1/8	1 1/4							40	1	F	51 1/2	2 1/4	1/4	2	51 1/2	2 1/4	1/4	2	159 1/2	34
Walker M 1/2													43	2 1/4	1/8	2	14	1 3/4	1/8	4	90	32
Walker K1													45 1/2	2 1/2	1/8	2	16	2	1/8	4	96	32
Walker L2													53 1/4	2 1/2	1/8	2	19	2	1/8	4	120	32
Walker P3 1/2													53 1/4	3	1/8	2	19 1/8	2 1/2	1/8	4	140	35
Walker N5													53 1/4	3	1/8	2	19 1/8	2 1/2	1/8	4	162	35
W.J.-B2 1/2	4	1/4	1 1/4	1 1/4									13	3 1/2	1/4	4	13	3 1/2	1/4	4	133	32 1/8
Walter S-5	3	1/4	1/2	2	V	10	1 1/2	18	1 1/2	39	1 1/2	F	15	5	1/4	4	57	2 1/2	1/4	2	150	36
Ward LaFrance 2B-2 1/2—1920	3	1/4	1 1/4	1 1/2	V	7	1 1/2	16	1 1/2	41 1/2	1 1/2	F	13	3 1/2	1/4	4	13	3 1/2	1/4	4	136	33
Ward LaFrance 4A-3 1/2—1920	3	1/4	1 1/4	1 3/4	V	8 1/2	1 1/2	18	1 1/2	41 1/2	1 1/2	F	15 1/2	3 3/4	1/4	4	15 1/2	3 3/4	1/4	4	170 1/8	37
Ward LaFrance 5A-5—1920	3	1/4	1 1/2	1 3/4	V	9 1/4	1 1/2	18	1 1/2	41 1/2	1 1/2	F	18	4	1/4	4	18	4	1/4	4	170 1/8	37
Ward WS2													14 7/8	1 1/2	1/8	8	14 7/8	1 1/2	1/8	8	66	33 1/8
Ward WA													18	2	1/8	8	18	2	1/8	8	95	33 1/8
Ward WB													19 5/8	2	1/4	8	19 5/8	2	1/4	8	120	33 1/4
Ward WD													49 5/8	2 1/4	1/4	4	49 5/8	2 1/4	1/4	4	144	33 1/4
Ward WF													55 1/8	2 1/2	1/4	4	55 1/8	2 1/2	1/4	4	168	34 3/8
Ward WH													68 3/4	3	1/4	4	68 3/4	3	1/4	4	192	37
Watson B1	4	1/4	1	1 1/8	V	16 1/2	1 1/4	4	1 1/4	40	1 1/2	F	41	1 3/4	1/8	2	41	1 3/4	1/8	2	90 1/2	30
Watson N-3 1/2	3	1/8	1 1/4	1 1/2	V	16 1/2	1 1/4	3	1 1/4	34	1 1/4	F	62	2 1/2	1/4	2	47	2 1/2	1/4	2	147	37
Watson U-5	3	1/8	1 1/4	1 1/2	V	16 1/2	1 1/4	3	1 1/4	38 1/2	1 1/4	F	15 1/2	3 3/4	1/4	4	15 1/2	3 3/4	1/4	4		36
White 15-3/4	3																				85 1/2	34
White. 20-2	3																				107 1/2	34
White 40-3																					157	42
White 45-5																					157	42
White Hickory H-1 1/2—1919	3	1/8	1 1/4	1		11	2	8	1 1/4	41	5/8	V	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	116 1/4	32
White Hickory H-1 1/2—1920	3	1/8	1 1/4	1		11	2	8	1 1/4	41	5/8	V	11 3/4	3 1/4	1/4	4	11 3/4	3 1/4	1/4	4	116 1/4	32
White Hickory E-1—1920	3	1/8	1 1/4	1		11	2	8	1 1/4	41	5/8	V	11	3	1/4	4	11	3	1/4	4	92 1/4	32 1/2
White Hickory K-2 1/2—1920	3	1/8	1 1/2	1 1/4		9	1 1/2	8	1 1/4	33 1/4	1 1/4	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	150	32
Wichita K-1—1915-20-21	3	1/8	1	1 3/8	V	18 1/2	1 1/4	12	1 1/4	52 3/4	1 1/2	F	19 1/2	2	1/8	4	19 1/2	2	1/8	4	127 1/2	30
Wichita L-1 1/2—1916-20-21	3	1/4	1	1 3/8	V	18 1/2	1 1/4	12	1 1/4	52 3/4	1 1/2	F	49	2	1/8	2	49	2	1/8	2	127 1/2	30
Wichita M-2—1915-20-21	3	1/4	1	1 3/8	V	18 1/2	1 1/4	12	1 1/4	52 3/4	1 1/2	F	49	2	1/8	2	49	2	1/8	2	126 1/2	30
Wichita R-2 1/2—1917-20-21	3	1/4	1	1 7/8	V	18 1/2	1 1/4	12	1 1/4	52 3/4	1 1/2	F	54	2 1/4	1/8	2	54	2 1/4	1/8	2	126 1/2	30
Wichita RX-2 1/2—1919-20-21	4	1/4	1 1/4	1 3/4	V	5	1 1/4	11	1 1/4	40	1 1/2	F	54	2 1/4	1/8	2	54	2 1/4	1/8	2	130	30
Wichita O-3 1/2—1915-20-21	4	1/4	1 1/4	1 3/4	V	5	1 1/4	11	1 1/4	40	1 1/2	F	56 1/2	2 1/2	1/4	2	56 1/2	2 1/2	1/4	2	152 1/2	36
Wichita S-5—1919-20-21	4	1/4	1 1/4	1 3/4	V	5	1 1/4	11	1 1/4	40	1 1/2	F	66	3	1/4	2	66	3	1/4	2	163 1/2	36
Wilcox AA-1—1920	3	1/4	1										47 1/8	2 1/2	1/8	2	33 1/4	2 1/2	1/8	2	96	34
Wilcox B-1 1/2—1920	3	1/4	1 1/4										47 1/8	2 1/2	1/8	2	33 1/4	2 1/2	1/8	2	132	33
Wilcox C-2 1/2—1920	3	1/4	1 1/4										57 1/2	2 1/2	1/8	2	42 1/2	2 1/2	1/8	2	141	33
Wilcox E-3 1/2—1920	3	1/4	1 1/4										57 1/2	2 1/2	1/4	2	42 1/2	2 1/2	1/4	2	156	33
Wilcox F-5—1920	3	1/4	1 1/2										69 3/8	3 1/2	1/4	2	52	3 1/2	1/4	2	148 1/2	36
Wilson 1 1/2—1919-20	4	1/8		1									39 1/2	1 3/4	1/8	2	39 1/2	1 3/4	1/8	2	120	33
Wilson 2 1/2—1919-20	4	1/8		1 1/4									13 1/4	3 1/2	1/8	4	13 1/4	3 1/2	1/8	4	126	33
Wilson 3 1/2—1919-20	4	1/8		1 1/2									16	3 3/4	1/8	4	16	3 3/4	1/8	4	147	38
Wilson 5—1919-20	4	1/8		1 1/2									18	4	1/8	4	18	4	1/8	4	147	38 1/4
Winther 751-1	3	1/4	1			15 3/4	2	17	2	36 1/8	1	F	42	2	1/8	2	24	2	1/8	1	102	30
Winther 39-1 1/2	3	1/4	1 1/4			10	1 3/4	4 1/8	1 1/2	33 1/4	1 1/4	F	50	2 1/4	1/4	2	22 1/2	2 1/4	1/4	1	120	30
Winther 430-1 1/2	3	1/4	1 1/4			11 1/4	1 1/2	11 1/2	1 1/4	30 5/8	1 1/2	F	50	2 1/4	1/4	2	22 1/2	2 1/4	1/4	1	120	30
Winther 49-2	3	1/4	1 1/4			11 1/2	1 1/2	6 1/2	1 1/2	37 1/2	1 1/4	F	52	3	1/4	2	50	2 1/4	1/4	2	144	33
Winther 450 2 1/2	3	1/4	1 1/4			11 1/2	1 1/2	6 1/2	1 1/2	37 1/2	1 1/4	F	52	3	1/4	2	22 1/2	2 1/4	1/4	2	120	30
Winther 70-3 1/2	3	1/4	1 1/4			17 1/8	1 3/4	8	1 1/2				62	3	1/4	2	60	2 1/2	1/4	2	156	33
Winther 109-5	3	1/4	1 1/2			21 1/2	1 3/4	8	1 1/2	42 1/4	2	F	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 140-7	3	1/4	1 1/2			12	1 3/4	6	1 3/4	42 1/4	2	F	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Witt Will N-1 1/2—1919-20	3	1/8	1 1/4	1 1/4	V	8	1 1/2	12	1 1/4	31	1 1/4	F	48	3 1/4	1/4	4	48	3 1/4	1/4	4	Opt	32
Witt Will P-2—1919-20	3	1/8	1 1/4	1 1/4	V	8	1 1/2	12	1 1/4	31	1 1/4	F	52	3 1/2	1/4	4	52	3 1/2	1/4	4	Opt	32
Wolverine J 1	3	1/8	1	1/8									43 1/2	2 1/2	1/4	1	39	1 1/2	1/4	1	Opt	
Wolverine J 1 1/2	3	1/8	1	1/8									52	3	1/8	1	47	2	1/8	1	Opt	
Wolverine J 2	3	1/8	1	1/8									52	3	1/8	1	47	2	1/8	1	Opt	
Wolverine K 2 1/2	4	1/8	1 1/4	1/4									57	2	1/8	1	54 1/2	2	1/8	1		
Wolverine L 3 1/2	4	1/8	1 1/4	1/4									54	2 1/4	1/8	2	26	4	1/8	1		
Yale A-1 1/4 Speed Truck			1 1/4	1 1/4									41 1/2	2	1/4	1	41 1/2	2	1/2	1	96	32
Yellow Cab M21—3/4			1	1/8									49	2 1/2	1/4	2	45	2 1/2	1/4	2	60	43
Yellow Cab M41-1			1	1/8									11	3	1/4	4	11	3	1/4	4	92	32
Young 5-1	3	1/8	1										12	3 1/4	1/8	2	12	3 1/4	1/8	2	109	32
Young 6-2	4	1/4	1 1/4										12 1/4	3 1/4	1/8	2	12 1/4	3 1/4	1/8	2	116 1/2	33
Young 7-3 1/2	4	1/4	1 1/2										16	3 1/2	1/8	2	16	3 1/2	1/8	2	183 1/2	36

KEY OF ABBREVIATIONS

KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Page Following. In All Specifications—O, Own; Op or Opt, Optional

Engine:
Beav—Beaver
Cont—Continental
GBS—Golden, Belknap & Swartz
Gr-B—Gray-Beal
Her—Hercules
Hig—Highway
Hin—Hinkley
HSp—Herschell-Spillman
1 LeR—Le Roi
Lib—Liberty
LMF—Light Mfg. & Fdy.
Lyco—Lycoming
Mid—Midwest
Rut—Rutenber
Ster—Sterling
Sup-Supreme
TC—Twin City
Vict—Victory
Wau—Waukesha
Wei.—Weidely
Wis—Wisconsin

Valve Arrangement:
H—Overhead
2 L—ELL-Head
T—TEE-Head
S—Sleeve

How Cooled:
A—Air
B—Pump & Thermo
3 C—Centrifugal
G—Gear Pump
T—Thermo-Syphon

Radiator (Make):
BW—B & W
Brm—Brenem
Bus—Bush
Can—Candler
Chic—Chicago
EM—English-Mersick
Eur—Eureka
Fed—Fedders
Flex—Flexo
GO—G. & O.
4 Har—Harrison
Hoo—Hooven
Idl—Ideal
Jam—Jamestown
Kue—Kuenz
Liv—Livingston
Lng—Long
McC—McCord
May—Mavo
Mod—Modine
Per—Perfex
R-T—Rome-Turney
S-W—Sparks-Withington
Spar—Spartan
Spec—Special
Spli—Splitex
Stan—Standard
Whee—Wheeler

5 Radiator (Type):
C—Cellular
H—Honeycomb
PT—Plain Tube
ZZT—Zig Zag Tube
FIN—Fin Tube

Lubrication:
6 FS—Force and Splash
F—Force Feed
S—Splash

Carburetor:
B&B—Ball & Ball
Bent—Bennett
Cart—Carter
Eag—Eagle
Ens—Ensign
Flch—Fletcher
Holl—Holley
John—Johnson
King—Kingston
Mar—Marvel
7 Mas—Master
Mill—Miller
Rayf—Rayfield
Scoe—Scoe
Strm—Stromberg
Shk—Shakespeare
Sheb—Schebler
Stew—Stewart
Till—Tillotson
Zen—Zenith

Fuel Feed:
8 G—Gravity
P—Pressure
V—Vacuum

Governor:
Con—Continental
Del—Delaney
Dup—Duplex
Hin—Hinkley
Mer—Merrill
9 McC—McCanna
Mon—Monarch
Phar—Pharo
Pier—Pierce
Rug—Ruggles
Sim—Simplex
Wau—Waukesha

Clutch (Make):
B. B.—Borg & Beck
B-Li.—Brown-Lipe
Covt.—Covert
Det.—Detlaff
Full.—Fuller
10 D. G.—Detroit Gear & Mach.
Hart—Hartford
HS—Hele-Shaw
M-E—Merchant & Evans
Munc.—Muncie
M-P—Muncie Products
T-D—Twin Disc
W-C—Warner Corporation
W-Gr—Warner Gear

Clutch (Type):
D—Disc
11 C—Cone
DP—Dry Plate
WP—Wet Plate
WD—Wet Disc
DD—Dry Disc
Fr—Friction

Ignition System:
Amr—American Swiss
AtK—Atwater-Kent
AuL—Auto-Lite
Bos—Bosch
Ber—Berling
Con—Connecticut
Del—Delco
Eis—Eisemann
Exi—Exide
Kin—Kingston
12 KW—K. W. Ignition Co.
Lor—Louraine
NE—North East
POL—Prest-O-Lite
Rm—Remy
Sim—Simms
Spl—Splitdorf
Wag—Wagner
Wes—Westinghouse

Engine Starter:
AC—Allis-Chalmers
AL—Auto-Lite
Bj—Bijur
Bos—Bosch
DL—Delco
Dy—Dyneto
13 GD—Gray & Davis
LN—Leece-Neville
NE—North East
RE—Remy
Wg—Wagner
USL—U. S. L.
W—Westinghouse

Gearset:
B-Li—Brown-Lipe
Cott—Cotta
Covt—Covert
D-Sea—Driggs-Seabury
Det—Detroit
Dun—Dundore
Durst—Durston
14 Full—Fuller
G-Le—Grant Lees
MM—Mechanics Mach. Co.
Munc—Muncie
M-P—Muncie Products
Rock—Rockford
W-C—Warner Corporation
W-Gr—Warner Gear

Location of Gearset:
15 A—Amidships
R—Rear
U—Unit with engine
J—Unit with jackshaft

Universal:
A-B—Easton Mch. Co.
Acm—Acme
16 Arv—Arvac
Bear—Bearings Co.
Bld—Blood Brothers
Det—Detroit
Dit—Ditwiler
Flex—Flexite
Hart—Hartford
KB—Kinsler-Bennett
Mech—Mechanics
M-E—Merchant & Evans
Nor—Norwalk
Pet—Peters
Sned—Snead
Spic—Spicer
Ster—Sterling
Ther—Thermoid
UM—Universal Machine
UP—Universal Products

Springs:
All—Alloy Steel
Am—Am. Auto Parts
Bea—Beans
Cham—Champion
Coop—Cooper
Del—Delany
Det—Detroit
GC—Garden City
Har—Harvey
Hig—Higgins
IC—Iron City
Jax—Jaxon
Kal—Kalamazoo
Lah—Laher
Lig—Liggett
17 Mar—Maremont
Math—Mather
Mer—Merrill
Nat—National
Pen—Penn
Per—Perfection
Row—Rowland
Shel—Sheldon
SP—Spring Perch
Stan—Stan-Par
Ster—Sterling
Tem—Temme
Tut—Tuthill
US—United States
Wis—Wisconsin

Final Drive:
B—Bevel Gear
C—Chain
I—Internal Gear
18 N—Concentric Spur
P—Spur
R—Double Reduction
S—Spiral Bevel
W—Worm

Rear Axle (Make):
Amr—American
Badg—Badger
Col—Columbia
Stan—Chicago
19 Cl—Clark
Dun—Dunkirk
Eat—Eaton, Stan-Par
Hind—Hindley
Ir.M—Iron Mt.
Keno—Kenosha
Ken—Kennedy
Rock—Rockford
Russ—Russel
Sals—Salisbury
Sav—Savage
Shel—Sheldon
Thom—Thomson
Tim—Timken
Torb—Torbensen
W-M—Weston-Mott
US—United States
Vul—Vulcan
Walk—Walker
Wis—Wsconsin

Rear Axle (Type):
Flot—Floating
20 ½-Fl—Semi-Floating
¾-Fl—¾-Floating
D—Dead

Steering Gear:
CAS—C. A. S. Products Co.
Dit—Ditwiler
Gem—Gemmer
21 Jac—Jacox
Lav—Lavine
M-P Muncie Products
Ros—Ross
W-C—Warner Corporation
Woh—Wohlrab

Wheels:
Arc—Archibald
AuW—Auto Wheel
Bim—Bimel
Cla—Clark
C&M—Crane & McMahon
Day—Dayton
Det—Detroit
E&O—Eberly & Oris
Hay—Haynes
Hoo—Hoopes Brothers
Jon—Jones
Kel—Kelsey
Mot—Motor Wheel
22 Mut—Mutual
Nor—Northern
Pru—Prudden
Roy—Royer
Rus—Russell
Sal—Salisbury
Sch—Schwartz
Smi—Smith
Sta—Stanwell
StM—St. Mary
Stn—Standard
Wal—Walker
Wan—Wayne
W-L—Waterhouse & Lester
Wes—Western Wheel Co

Rim Equipment:
Bak—Baker
Det—Detroit
23 Fir—Firestone
Gdy—Goodyear
Jax—Jaxon
Kel—Kelsey
Stn—Stanweld

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(Where prices are not given it is because we have been unable to get them from authoritative sources)

* An asterisk in front of the model name indicates that corrections have been made somewhere in the specifications since the previous month

Trade Name and Model	Chassis Price	ENGINE DETAILS: Make and Model Number 4 Cylinder unless otherwise noted	Bore and Stroke	N. A. C. C. Horsepower	Valve Arrange't	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	GEARSET: Make	Location	Speeds	Universal (Make)	Springs (Make)	REAR AXLE: Final Drive	Make	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	TIRES, WHEELS, RIMS: *Pneumatic †Dual Front	Rear	Wheels (Make)	Rim Equipment	Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels
1000 Pounds		1		2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20			21			22	23			
Dodge Brothers	1085	Own	3 7/8x4 1/2	24	L	C	McC	PT	FS	Stew	V	.....	Own	DD	Own	NE	Own	U	3	Own	.....	S	Own	Flot	4.1	19.4	Own	33x4	33x4	Kel	Kel	1990	114	66.5
*Seneca M.	1020	LeR	3 1/8x4 1/2	15.6	L	T	Kue	C	S	Sheb	V	.....	B.B.	D	Con	AC	W-Gr	U	3	UM	Math	S	Peru	Flot	4.75	14.45	Dit	30x3 1/2*	30x3 1/2*	Day	Jax	1700	108	80
Vim 29.	1355	Own	3 1/8x4 1/2	15.6	L	T	McC	PT	FS	Zen	G	.....	B.B.	DD	Wes	W	Own	U	3	Spic	Shel	W	Own	.....	5.5	.....	CAS	31x4*	31x4*	Hoo	Fir	2175	108	....
Vim 30.	1550	Own	3 1/8x4 1/2	15.6	L	T	McC	PT	FS	Zen	G	.....	B.B.	DD	Wes	W	Own	U	3	Spic	Shel	W	Own	.....	5.5	.....	CAS	32x4 1/2*	32x4 1/2*	Hoo	Fir	2290	127	....
1500 Pounds																																		
*Acme G.	.....	Cont N	3 3/4x5	22.5	L	T	GO	C	FS	Rayf	V	.....	B.B.	DP	Eis	GD	Cott	U	3	Bld	Det	W	Timk	1/2 Fl	6.2	24.8	Ros	35x5*	35x5*	Bim	.....	3050	130	50
Brockway E.	1675	Buda WU	3 3/4x5 1/8	22.5	...	T	Lng	Fin	FS	Strm	V	.....	W-Gr	DD	Con	Dy	W-Gr	U	3	Spic	Row	S	Col	3/4 Fl	5.1	25.	Gem	35x5*	35x5*	.....	Fir	3450	135	70
*Chevrolet G	820	Own	3 1/2x4	21.7	H	B	Har	.....	FS	Zen	...	.....	.....	C	Rm	AL	M-P	...	3	Arv	.....	S	.....	1/2 Fl	.....	.....	M-P	31x4	34x4 1/2	.....	Jax	2167	120	....
Clydesdale 18.	1890	Cont N	3 3/4x5	22.5	...	G	Own	Pt	F	Zen	V	Own	B-Li	DD	Bos	.....	B-Li	U	3	Spic	Stan	W	Timk	1/2 Fl	5.1	16.6	Ros	34x5*	35x5*	.....	.....	3200	136	....
*G. M. C. K-15	.....	Own	3 1/2x5 1/2	19.6	L	B	Own	Fin	F	Mar	G	Own	Own	DD	Eis	Opt	Own	U	3	UM	Det	B	Own	3/4 Fl	6	21.12	Own	33x4 1/2*	33x4 1/2*	Kel	.....	3225	132	64
*Garford 15	.....	Buda MU	3 5/8x5 1/8	21	L	C	Lng	PT	F	Strm	G	.....	.....	DD	AtK	W	Own	U	3	Spic	Per	W	Timk	1/2 Fl	6.25	.....	Gem	34x5*	34x5	.....	.....	3500	132	....
Globe D-20	.....	Sup S4	3 5/8x5	18.2	L	T	.....	C	S	Strm	V	.....	B.B.	D	Del	DL	W-Gr	U	3	Nor	Per	I	Torb	.....	.....	.....	Gem	33x4 1/2*	33x4 1/2*	Bim	Fir	2600	120	50
H R. L.-L.	2200	H-Sp 7000	3 1/2x5	19.6	L	T	Fed	Fin	F	Zen	V	.....	Own	DP	Bos	GD	Covt	U	3	Spic	Shel	W	Wis	1/2 Fl	6.2	22.	Ross	34x4 1/2*	35x5*	Sch	Gdy	3300	134	....
*Internat'l Speed Truck S.	1500	Lyco-Int'l	3 1/2x5	19.6	L	T	Lng	Fin	FS	Ens	G	.....	Mun	DP	Con	AL	Mun	U	3	Sned	Stan	I	Torb	D	6.3	.....	CAS	34x5*	34x5*	Opt	.....	2900	124	50
Kearns 3/4	1600	L. M. F.-H	3 1/4x4 1/2	16.9	L	T	Own	H	FS	Zen	G	Pier	B.B.	DD	Ber	Dy	G-Le	U	3	M-E	Math	I	Torb	D	6.5	19.	Lav	32x4 1/2*	32x4 1/2*	.....	Fir	2000	118	65
Napoleon 7	1350	H-Sp	3 1/2x5	19.6	H	T	Own	H	F	Sheb	G	.....	B.B.	D	....	GD	MM	U	3	UP	Math	....	Torb	D	5.1	.....	Lav	34x4 1/2	.....	.....	Fir	2800	121	....
Rainier R11.	2150	Cont-N	3 1/2x5	19.6	L	T	Har	H	FS	Zen	V	Mon	B-Li	DP	Eis	.....	B-Li	U	3	Hart	Per	W	Tim	.....	7.2	23.9	Lav	35x5*	35x5*	.....	Fir	2350	125	80
Samson 15.	.....	Own	3 1/4x4	21.8	H	C	.....	Pt	S	Zen	G	.....	.....	P	Sim	.....	Own	A	3	Own	.....	S	Own	.....	6.33	21.02	Own	32x4*	32x4*	Own	.....	2300	118	46
*Service 15.	1840	Mid	3 5/8x5	21	H	C	Lng	Fin	F	Sheb	G	.....	B-Li	DP	Rm	RE	B-Li	U	3	M-E	.....	B	Eat	.....	5.625	22.1	Own	34x4 1/2*	35x5*	Det	.....	3540	132	....
Stewart 11.	1350	LeR-2C	3 1/2x4 1/2	15.6	...	C	T	Bus	PT	FS	Zen	G	.....	B.B.	DP	Eis	Dy	Durs	U	3	Hart	Det	I	Cl	D	6.6	19 8	CAS	32x4	32x4	Way	Fir	2190	110	66.7
Triangle AA.	1600	H-Sp	3 3/4x5	16.9	L	T	Per	ZZT	FS	Strm	G	.....	Full	DD	NE	NE	Full	U	3	UP	Det	I	Cl	.....	6.75	20.	Gem	35x5*	35x5*	Hay	Fir	2600	115	60
Watson B.	1750	Wau BUX	3 3/4x5 1/4	22.5	L	P	GO	C	FS	John	G	Wau	B-Li	DP	Con	D	B-Li	U	3	M-E	Shel	W	Emp	1/2 Fl	6.2	20.7	Lav	35x5	35x5	Hoo	Fir	2900	128	60
*White 15.	2600	Own	3 3/4x5 1/2	22.5	L	C	.....	C	FS	Own	G	.....	Own	D	....	.....	.....	A	4	Own	.....	B	Own	1/2 Fl	.....	.....	Own	34x5*	34x5*	.....	Fir	3200	133	....
Yellow Cab M-21	2050	Cont N-3/4	3 3/4x5	22.5	L	T	Lng	Fin	FS	Zen	G	.....	B-Li	DD	Bos	.....	B-Li	U	3	Spic	Math	B	Tim	.....	4.9	16.31	Gem	33x4 1/2	33x4 1/2	Stn	Fir	2400	116	65
1 Ton																																		
Acason R.	2260	Wau B.U.X.	3 3/4x5 1/4	22.5	L	P	Can	C	S	Sheb	V	Wau	Full	.....	Eis	.....	Full	U	4	Bld	Det	W	Tim	.....	7.20	34.5	Ros	36x3 1/2†	36x5	Bim	Opt	3650	142	....
*Acme B.	.....	Cont N	3 3/4x5	22.5	L	T	GO	C	FS	Rayf	V	Dup	B.B.	DP	Eis	GD	Cott	U	3	Bld	Det	W	Tim	1/2 Fl	7.2	28.8	Ros	34x3 1/2	34x5	Bim	.....	3350	130	50
*Akron Multi-Truck	1995	Hin	4 x5 1/4	25.6	L	T	C	Fed	H	F	Strm	G	.....	War	DP	Wes	W	W-Gr	U	3	.....	Stan	S	Eat	1/2 Fl	5.125	.....	Jac	34x5*	34x5*	Bim	Fir	3600	134	....
*Apex G.	1695	Lyc KB	3 1/2x5	19.6	L	T	GO	C	S	Strm	V	.....	B.B.	DP	AuL	AL	Mun	U	3	Bld	Det	I	Torb	D	6.5	.....	Lav	33x5*	33x5*	Roy	Fir	2450	130	70
Armleder 20.	.....	Buda CTU	3 3/4x5 1/4	22.5	L	P	Own	Fin	F	Zen	V	.....	Full	DD	Bos	W	Full	U	3	Spic	Math	W	Timk	Flot	7.25	29	Ros	34x3 1/2	34x5	StM	.....	3950	148	80
Atlas 21.	.....	Lyco	3 1/2x5	19.6	L	T	Own	H	S	Strm	...	.....	B.B.	DD	AtK	Bj	Own	...	3	Ster	IC	W	Own	1/2 Fl	6	16.8	CAS	32x4 1/2*	32x4 1/2*	.....	.....	2650	130	70
Avery	.....	Own 6	3 x4	21.6	L	T	Own	C	S	Strm	V	Own	Own	DP	KW	W	Own	U	3	Pet	Math	I	Torb	.....	8	26.66	Ros	34x5*	34x5*	StM	Gdy	2800	129	73
Beck Hawkeye A.	1950	H-Sp N-3/4	3 3/4x5	22.5	L	T	Har	C	S	Strm	G	Pier	Full	DD	Bos	.....	Full	...	3	Bld	Hig	W	Cl	D	6.1	20.51	Lav	35x5*	35x5*	Hay	Fir	2800	124	75
Bell M.	1650	Buda	3 5/8x5 1/8	21	L	T	Chic	PT	F	....	V	.....	B.B.	DP	Eis	.....	Mun	U	3	Ther	Det	W	Ir-M	.....	7.75	.....	Dit	35x5	35x5	Bim	Fir	2500	120	65
Belmont.	.....	GBS-SMG	3 3/4x4 1/4	22.5	L	T	GO	.....	S	Zen	G	.....	B.B.	.....	Con	Dy	.....	U	3	Ster	.....	B	.....	3/4 Fl	5.2	15.75	Lav	31x4*	31x4*	E-O	Stn	2000	113	60
Bessemer.	.....	Cont N	3 1/2x5	19.6	L	T	.....	C	FS	Strm	G	.....	Full	DD	Bos	.....	Full	U	3	Arv	Per	I	Torb	D	7.1	20.25	Ros	34x3 1/2	34x4	Sch	Fir	2910	124	57
Bethehem K.	1695	Own K	3 1/2x5	19.6	L	T	Liv	C	F	Zen	G	.....	B.B.	DP	Bos	GD	Det	U	3	Spic	Math	I	Eat	3/4 Fl	6.87	18.75	Ros	34x4 1/2*	35x5*	Way	.....	2715	125	....
Birch 1.	1595	Vict	3 1/2x5	19.6	I	T	Chic	PT	FS	Strm	G	.....	Full	DD	Con	.....	Full	U	3	UM	.....	I	Cl	D	.....	.....	Lav	32x3 1/2	32x4	.....	.....	3200	132	....
*Briscoe 4-34	.....	Own 4-34	3 3/4x5	18.2	L	C	S-W	ZZT	FS	Scoe	G	.....	Own	C	Con	AL	Own	U	3	Own	All	S	Own	1/2 Fl	4.18	13	Own	31x4*	31x4*	Hay	Jax	1550	109	50
*Chevrolet T.	1225	Own	3 1/4x5 1/4	21.7	H	C	Har	.....	FS	Zen	...	Mon	.....	C	Rm	AL	M-P	...	3	Arv	.....	W	.....	1/2 Fl	.....	.....	M-P	33x4*	35x5*	.....	Jax	2840	125	....
Clydesdale 32 C.	2375	Own CU2	3 3/4x5 1/8	22.5	L	T	G	Own	PT	F	Zen	V	Own	B-Li	DD	Bos	.....	B-Li	U	3	Spic	Per	W	Timk	1/2 Fl	7.25	24.1	Ros	34x3 1/2	34x5	.....	.....	4000	149	72
Collier 18.	.....	Cont N	3 1/2x5	19.6	T	P	Lng	PT	S	Zen	V	Mon	Full	DP	Eis	.....	Full	U	3	UP	Math	W	Timk	.....	7.75	31	Ros	34x4	34x5	Bim	Fir	3210	140	70
Corbitt E.	2400	Cont N-3/4	3 3/4x5	22.5	L	T	McC	Fin	FS	Strm	V	Sim	Full	DD	Eis	.....	Full	U	3	Hart	Shel	W	Shel	1/2 Fl	6.5	19.5	Ros	34x3 1/2	34x4	Bim	Fir	3890	130	75
Day Elder A	2225	Cont N	3 3/4x5	22.5	L	T	Bus	Fin	FS	Zen	G	.....	Covt	DD	Eis	.....	Covt	U	3	Hart	IC	W	Shel	1/2 Fl	7.8	28.55	Gem	34x3 1/2	34x4	Jon	Fir	3250	128	70
*Defiance G.	1975	Hig	3 3/4x5	22.5	L	T	Per	C	F	Strm	V	.....	B.B.	D	Eis	AL	G-Le	U	3	Arv	Det	B	Eat	.....	5.5	.....	Own	35x5*	35x5*	.....	.....	2700	128	....
*Denby 12.	2200	Cont N-3/4	3 3/4x5	22.5	L	T	C	Lng	PT	FS	Strm	G	Mon	Full	DD	Eis	.....	Full	U	3	UP	Det	I	Russ	D	6.8	21.75	Ros	35x5*	36x6*	Hay	Fir	3220	124	73
Dependable Dispatch A	1750	Buda MU	3 5/8x5 1/8	21	L	T	Lng	Fin	F	Zen	V	Mon	B.B.	DD	Spl	AL	Det	U	3	Acm	Per	W	Tim	1/2 Fl	6.25	20.55	Ros	35x5*	36x6*	Bim	Fir	4000	134	75
Diehl A.	.....	Cont N	3 1/2x5	19.6	...	T	.....	H	FS	Zen	G	.....	B.B.	.....	Sim	.....	Durs	...	3	KB	Mar	I	Torb	D	5.3	.....	Ros	34x4 1/2*	35x5*	Sch	Fir	2400	115	90
Diehl B.	.....	H-Sp	3 1/2x5	19.6	...	T	.....	H	FS	Zen	G	.....	M-E	.....	Bos	.....	Durs	...	3	M-E	Row	I	Torb	D	5.3	.....	Ros	.....	.....	Wan	.....	.....	.....	.....
Federal SD.	2500	Cont J-4	3 3/4x5	22.5	L	T	C	Own	Fin	F	Zen	V	Phar	B.B.	DP	Eis	.....	Own	A	3	Spic	Math	W	Timk	1/2 Fl	7.2	20.65	Gem	35x5*	36x6*	Det	Det	3600	132	65
Ford T.	545	Own	3 3/4x4	22.5	L	T	Own	Fin	S	Holl	G	.....	Own	WD	Own	.....	Own	U	2	Own	Own	W	Own	1/2 Fl	Opt	19.9	Own	30x3 1/2*	32x4 1/2	.....	.....	1380	124	....
Forschler A.	.....	Cont N	3 1/2x5	19.6	L	C	EM	.....	FS	Zen	...	Dup	Full	.....	Bos	.....	Hart	U	3	Hart	Own	W	Shel	.....	.....	.....	Ros	34x3	34x4	.....	.....	3450	120	....
*Fulton A.	1750	H-Sp-7000	3 1/2x5	19.6	...	B	Liv	H	FS	Cart	G	.....	DP	B.B.	Ber	W	Spic	U	3	Spic	Row	W	Col	.....	6.8	.....	Lav	34x5*	34x5*	Hoo	Fir	2800	130	65
		Own	3 1/4x5 1/4	19.6	L	B	Own	Fin	F	Mar	G	Own	Own	DD	Eis	.....	UM	U	3	UM	Det	B	Own	3/4 Fl	6	21.9	Own	34x5*	34x5*	.....	.....	3530	132	66
		Own	3 1/4x5 1/4	19.6	L	B	Own	Fin	F	Mar	G	Own	Own	DD	Eis	.....	Per	U	3	Per	Per	B	Sels	3/4 Fl	5.75	21	.....	33x5*	33x5*	.....	Fir	2875	129	90

| | | |

Trade Name and Model	Chassis Price	ENGINE DETAILS: Make and Model Number 4 Cylinder unless otherwise noted	Bore and Stroke	N.A.C.C. Horsepower	Valve Arrang't	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	GEARSET: Make	Location	Speeds	Universal (Make)	Springs (Make)	REAR AXLE: Final Drive	Make	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	TIRES, WHEELS, RIMS: *Pneumatic †Dual Front	Rear	Wheels (Make)	Rim Equipment	Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels
		1			2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20			21			22	23			
1½ Ton—Con'd																																		
Federal TE	2725	Cont C4	4 1/8x5 1/4	27.2	L	C	Own	PT	FS	Zen	G	Phar	B.B.	DP	Eis	.....	Own	A	4	Spic	Mat	W	Timk	Flot	8.5	37.4	Gem	36x3 1/2	36x5	Sch	Fir	4050	144	68.5
Forschler AX	.....	Cont N	3 1/2x5	19.6	L	C	Own	.....	FS	Zen	...	Dup	Full	.....	Bos	Op	Full	...	3	Hart	Own	W	Shel	.....	.....	.....	Ros	36x3 1/2	36x5	Smi	.....	3670	120	...
Front Drive C	2800	Buda CTU	3 3/4 x5 1/4	22.5	L	G	EM	PT	S	Zen	...	Pier	B.B.	DD	Spl	Op	Own	A	3	Own	Own	W	Own	1/2 Fl	8	32	Lav	34x5	34x5	Stn	.....	3200	Op	55
Gary GT	2550	Buda IU	4 x5 1/2	25.6	L	C	Chic	Fin	F	Mas	G	McC	Full	DD	Eis	.....	Full	U	3	Bld	Det	W	Timk	Flot	7.2	21.7	Ros	36x3 1/2	36x5	Pru	Gdy	3800	144	68
Gersix M	3100	Buda ITU	4 x5 1/2	25.6	L	C	Idl	C	F	Strm	V	Mon	B B.	...	Bos	.....	Cott	U	3	Bld	Tut	W	Shel	.....	7.7	31	Ros	36x3 1/2	36x6	Jon	.....	4300	142	70
Giant 15A	2425	Cont N	3 3/4 x5	22.5	L	T	Idl	.....	FS	Sheb	G	.....	B-Li	DD	Eis	.....	B-Li	U	3	Spic	Math	W	Timk	.....	7.8	24.97	Jac	34x3 1/2	34x5	Way	.....	2950	138	94
Graham Bros Speed Truck	2495	Cont N	3 3/4 x5	22.5	L	T	Lng	PT	FS	Strm	G	Mon	Full	DD	Eis	Op	Full	U	3	Hart	Det	I	Torb	D	7	28	Lav	35x5*	36x6*	Det	Det	2950	133	80
Gramm Bernstein 15	2050	Cont N	3 3/4 x5	22 5	L	T	Own	Fin	S	Strm	G	.....	Full	DD	NE	NE	Own	A	3	Own	Per	W	Cl	D	7.6	30.4	Ros	36x3 1/2	36x5	Bim	Fir	3800	138	90.5
Gramm Bernstein 65	2725	Cont N	3 3/4 x5	22 5	L	T	Own	Fin	S	Strm	G	.....	Full	DD	NE	NE	Own	A	3	Own	Per	W	Eat	1/2 Fl	7.8	28	Ros	36x3 1/2	36x5	Bim	Fir	4200	138	90.5
G. W. W. Farm Spec	2100	Wei	3 3/4 x5 1/2	22 5	H	P	Chic	.....	F	Sheb	G	.....	Full	.....	Del	Del	Full	U	3	Acm	GC	I	Cl	.....	7	.....	Woh	35x5	35x5	Roy	Fir	3200	142	65
Hahn CD	.....	Cont C4	4 1/8x5	27 2	L	C	Own	.....	F	Strm	G	Pier	.....	DD	Spl	.....	R-Li	...	3	Spic	.....	W	Timk	.....	6	.....	Ros	36x3 1/2	36x6	.....	.....	4800	130	65
Harvey WEA	2550	Buda OU	4 1/8x5 1/2	27.2	L	G	.....	PT	F	Strm	G	Mon	Full	DD	Bos	.....	Full	U	3	Arv	Shel	W	Shel	.....	7.7	23.25	Ros	34x3 1/2	34x5	StM	.....	3850	128	80
Hawkeye K	2365	Buda QU	3 3/4 x5 1/4	22.5	L	C	.....	C	FS	Zen	G	Sim	Full	DD	Eis	.....	Full	U	3	Hart	Det	I	Cl	D	7.6	30.4	Ros	34x3 1/2	34x5	Bim	Fir	3750	148	70
Hewitt-Ludlow	.....	Buda CTU	3 3/4 x5 1/4	22.5	...	...	Mod	Fin	F	Strm	V	.....	.....	DP	Bos	.....	.....	...	3	Spic	.....	...	Shel	1/2 Fl	.....	.....	Ros	36x6*	36x6*	Sch	.....	.....	140	....
Higrade B20	2500	Cont K4	4 1/8x5 1/4	27 2	L	G	Per	PT	FS	Zen	V	.....	Full	DP	Eis	AL	Full	U	3	Bld	Per	W	Shel	.....	7.7	31	Lav	36x6	36x6	Det	Fir	3100	130	66
H.R.L.-R	3250	Hink HAA	4 x5 1/4	25.6	L	C	Fed	Fin	F	Zen	V	Hin	B-Li	DP	Bos	GD	B-Li	U	4	Spic	Shel	W	Shel	D	7.75	30	Ros	36x4	36x7	Sch	Gdy	4560	144	....
Huffman B	1995	Cont N	3 3/4 x5	22.5	...	T	Liv	C	F	Zen	G	Mon	Full	DD	Eis	.....	Full	U	3	Hart	Per	W	Amr	D	9.66	.....	Lav	35x5*	34x6	Roy	Fir	3200	140	85
Huffman C	1795	Buda WU	3 3/4 x5 1/2	22.5	...	T	Liv	C	F	Zen	G	Mon	Full	DD	Eis	.....	Full	U	3	Hart	Per	I	Torb	.....	8	.....	Lav	34x3 1/2	38x7*	Roy	Fir	3350	140	85
Hurlburt	2850	Buda IU	4 x5 1/2	25.6	L	C	Own	.....	FS	Fleh	G	Dup	B-Li	D	Eis	.....	B-Li	U	4	Spic	Per	W	Emp	.....	.....	.....	Ros	34x4	34x5	Way	.....	4300	148	85
Huron-Erie	.....	Buda CTU	3 3/4 x5 1/4	22.5	L	C	.....	Fin	F	Zen	V	Pier	B.B.	D	Bos	.....	Cott	U	4	Det	Det	I	Cl	.....	7	36.4	Jac	35x5	38x7	AuW	Fir	.....	144	90
Independent G (Iowa)	2040	Cont N	3 3/4 x5	22.5	L	C	GC	PT	FS	Strm	V	.....	Full	DD	Bos	.....	Full	U	3	Bld	GC	I	Russ	D	8.2	.....	Lav	34x3 1/2	34x5	StM	Fir	3550	135	75
Independent F (Ohio)	2585	Cont N	3 3/4 x5	22 5	L	C	Lng	PT	F	Strm	G	.....	Full	DP	Eis	.....	Full	U	3	Ster	Math	W	Wis	.....	8.2	33 1	Ros	36x3 1/2	36x5	.....	.....	3400	140	85
International 31	2050	Own	3 1/2x5 1/4	19.6	L	C	Own	Fin	FS	Ens	G	Own	Own	DP	Bos	Own	Own	A	3	Own	.....	I	Own	D	8	26.5	Own	36x3 1/2	36x4	Own	.....	3000	128	50
Jumbo 15	2425	Buda CTU	3 3/4 x5 1/4	22.5	L	C	Own	Fin	F	Zen	G	.....	Full	D	NE	NE	Full	U	3	Arv	Per	I	Cl	D	7.2	28.8	Jac	36x3 1/2	36x5	.....	.....	4530	144	75
Kalamazoo G	3100	Cont J4	3 3/4 x5	22.5	L	P	GO	PT	F	Strm	V	Mon	Full	D	Bos	Dy	Ful	A	4	Acm	Shel	W	Wis	1/2 Fl	8.2	41	Ros	36x4	36x5	Bim	.....	5080	144	80
Kearns 1½	2200	H-Sp 7000	3 1/2x5	19.6	L	T	Own	H	S	Zen	V	Pier	B.B.	DD	Ber	Dy	G-Le	U	3	ME	Math	I	Torb	D	8	24	Lav	34x3 1/2	34x6	Way	.....	3400	136	60
Kelly-Springfield K31	2900	Own	3 3/4 x5 1/4	22.5	L	C	Lng	Fin	F	Zen	G	Pier	Own	C	Eis	W	Covt	A	3	Own	Per	C	Own	D	8.6	31.58	Gem	36x3 1/2	36x6	StM	.....	4420	144	89
Kelly-Springfield K34	2900	Own	3 3/4 x5 1/4	22.5	L	C	Lng	Fin	F	Zen	G	Pier	B.B.	D	Eis	W	Covt	A	3	Spic	Per	W	Shel	1/2 Fl	8.6	31.78	Gem	36x3 1/2	36x6	StM	.....	4670	144	89
Kissel General Utility	2775	Own 40000	3 7/8x5 1/2	24.1	L	C	McC	PT	S	Strm	V	Pier	W-Gr	DP	Eis	.....	W-Gr	U	3	Spic	Mat	W	Shel	1/2 Fl	7.8	28.5	Jac	36x3 1/2	36x5	Pru	.....	4000	152	70.5
Kleiber A	3100	Cont C4	4 1/8x5 1/4	27.2	L	C	Per	C	...	Strm	G	.....	.....	WD	Bos	.....	B-Li	A	4	Spic	.....	W	Timk	3/4 Fl	7.1	37.51	Ros	36x3 1/2	36x6	Smi	.....	5200	143	75
*Koehler D	2285	H-Sp	3 1/2x5	19.6	...	T	Own	PT	F	Zen	G	Sim	B-Li	D	Eis	.....	.....	U	3	.....	Math	W	Dun	1/2 Fl	7.25	.....	Lav	34x3 1/2	34x5	Way	.....	3600	137	70
Larrabee-Deyo U	2400	Cont N3/4	3 3/4 x5	22.5	L	C	Bus	Fin	S	Sheb	G	Sim	B-Li	DD	Bos	.....	B-Li	U	3	.....	Mer	W	Shel	1/2 Fl	7.6	25.5	Ros	34x3 1/2	34x5	Hoo	.....	3600	138	....
Luedinghaus W	2700	Wau BUX	3 3/4 x5 1/4	22.5	L	G	Own	Pit	FS	Sheb	G	Wau	B B.	D	Spl	.....	Det	U	3	Spic	Tut	W	Wis	1/2 Fl	8.6	26.6	Lav	34x3 1/2	34x5	StM	.....	4100	144	75
Maccar L	2925	Cont C4	4 1/8x5 1/4	27.2	L	C	Own	Fin	FS	Strm	G	Pier	B-Li	DD	Eis	.....	B-Li	U	3	Spic	Mer	W	Timk	1/2 Fl	8.75	35.08	Ros	36x4	36x6	Day	Fir	4450	150	80
Mack AB1½	3000	Own	4 x5	25.6	L	C	Own	C	S	Sheb	G	Own	Own	DD	Spl	.....	Own	U	4	Spic	Mer	C	Own	D	6 9	28.01	Own	36x4	36x3 1/2	Sch	.....	4800	Op	68
Mack AB1½	3450	Own	4 x5	25 6	L	C	Own	C	S	Sheb	G	Own	Own	DD	Spl	.....	Own	U	4	Spic	Mer	R	Own	Flot	7.6	34 09	Own	36x4	36x3 1/2	Sch	.....	4900	Op	68
Master JW	2690	Buda OU	4 1/8x5 1/2	27.2	L	C	Chic	PT	S	Mas	V	McC	Full	DP	Eis	.....	Full	U	3	Spic	Det	W	Timk	1/2 Fl	7.7	23.25	Ros	34x3 1/2	34x5	Pru	.....	3900	142	78
Maxwell	1497	Own	3 5/8x4 1/2	21.	L	T	Own	PT	FS	.....	G	.....	Own	C	.....	.....	Own	U	3	Own	.....	W	Own	1/2 Fl	7.25	34.4	Own	35x5	35x5	.....	.....	2385	124	50
*Menominee H	2725	Wis EAU	4 x5	25.6	L	C	Own	Fin	FS	Strm	G	Mon	Det	DP	Eis	Opt	Cott	U	3	Spic	Tut	W	Wis	.....	8.25	30.36	Ros	36x3 1/2	36x5	Stn	Fir	4220	144	74
Moline 10	2450	Own NT	3 1/2x5	19 6	H	C	Mod	C	F	Till	G	Phar	.....	DP	Spl	.....	Own	U	3	Arv	Math	I	Torb	.....	8	38	Ros	34x5*	36x6*	.....	Fir	.....	130	....
Moreland 21B	3125	Cont K4	4 1/8x5 1/4	27.2	L	C	Own	C	FS	Mas	G	.....	Own	DD	Spl	.....	Own	A	4	Ther	U'S	W	Timk	.....	7	33.88	Ros	36x3 1/2	36x6	Smi	.....	4150	126	....
Napoleon 11	1860	Viet	3 1/2x5	19.6	H	C	Own	PT	F	Sheb	G	.....	Full	D	Con	AL	Full	U	3	Bld	Math	I	Torb	D	8	24	Lav	35x5*	36x6*	.....	Fir	3450	133	65
Nelson-LeMoon F1½	.....	Cont C4	4 1/8x5 1/4	27.2	L	C	Chic	Fin	S	Strm	G	Pier	B-Li	DD	Bos	W	B-Li	U	3	Own	Tut	W	Timk	.....	7	.....	Lav	36x3 1/2	36x6	Pru	Gdy	3400	Op	80
Noble B30	.....	Buda CTU	3 3/4 x5 1/4	22.5	L	C	Chic	Fin	F	Strm	G	Pier	Full	DD	Eis	W	Full	U	3	M-E	Tut	W	Shel	1/2 Fl	8.7	31.1	Lav	36x3 1/2	36x5	Bim	Fir	4680	156	85
Norwalk	2025	Lyco K	3 1/2x5	19 6	L	T	Stan	C	FS	Zen	V	.....	B.B.	D	Del	Dy	G-Le	U	3	U'M	SPar	W	Shel	3/4 Fl	7 75	.....	CAS	343 1/2	34x5	E&O	Fir	3200	143	75
Norwalk 35 E Special	2285	Buda CTU	3 3/4 x5 1/4	22.5	L	G	Stan	C	FS	Zen	V	.....	B.B.	D	Del	Dy	G-Le	U	3	Spic	Stan	W	Shel	3/4 Fl	7.2	.....	Det	34x4*	34x5	E&O	Fir	3450	150	43
O. K 1½T	2675	Buda ITU	4 x5 1/2	25 6	L	G	R-T	PT	FS	Zen	V	Pier	Full	DD	Eis	.....	Full	U	3	Hart	Cham	W	Wis	1/2 Fl	8.25	24.8	Ros	36x3 1/2	36x5	Bim	.....	...	146	....
Ogden A1	2550	Cont N	3 3/4 x5	22.5	L	T	Chic	PT	FS	Rayf	G	Pier	B-Li	DD	Bos	.....	B-Li	U	3	M-E	Tut	W	Shel	.....	8.75	.....	Gem	36x3 1/2	36x5	Stn	.....	3400	136	70
Old Reliable A	2500	WisEU	4 x5	25.6	L	C	Chic	PT	FS	Strm	V	Mon	Full	DD	Bos	Op	Full	U	3	Spic	Shel	W	Shel	1/2 Fl	7.7	24.94	Ros	34x3 1/2	36x6	StM	.....	4150	138	90
Oneida B9	2915	Oneida	4 x5 1/4	25 6	L	C	Own	C	F	Strm	V	Own	Own	DP	.....	.....	Own	A	3	Own	Math	W	Own	1/2 Fl	8.25	33	.....	36x6*	38x7	.....	.....	5025	144	....
Orleans A	.....	Her CU2	3 3/4 x5 1/2	22.5	L	C	Chic	PT	F	Mas	G	.....	Det	DD	Eis	.....	Cott	U	3	Bld	Mar	W	Wis	1/2 Fl	7	.....	Ros	36x3 1/2	36x5	Smi	Fir	.....	148	80
Paige 52-19	2880	HinHAA400	4 x5 1/4	25.6	L	C	Own	Fin	F	Strm	V	Hink	B-Li	DD	Bos	.....	B-Li	A	4	Spic	Per	W	Timk	1/2 Fl	7.7	37.51	Ros	34x3 1/2	34x5	Own	Fir	4000	140	85
*Power F	.....	Hink	4 x5 1/4	25.6	L	C	Lng	PT	F	Zen	V	Hin	Full	DD	Eis	W	Full	U	4	UM	Row	W	Vul	1/2 Fl	6.5	.....	Ros	35x5*	38x5*	StM	Fir	.....	140	28
Premocar	2350	Lyc-K	3 1/2x5	19.6	L	T	.....	C	S	Zen	V	.....	BB	...	Del	Dyn	G-L	U	3	Spic	Shel	W	Timk	.....	7	.....	Dit	36x6	36x6	.....	Fir	4200	130	70
Rainier R16	2600	Cont N	3 3/4 x5	22.5	L	T	Har	H	FS	Zen	V	Mon	B-Li	DP	Eis	.....	B-Li	U	3	Hart	Per	W	Shel	.....	7.8	.....	Lav	34x3 1/2	34x5	.....	Fir	3600	147	80
*Reliance 10A	2500	Buda ITU	4 x5 1/2	25 6	L	C	Bus	PT	FS	Strm	G	Pier	Full	DD	Eis	.....	Full	U	3	Pet	Shel	P	Badg	D	6.6	26.4	Ros	36x3 1/2	36x5	Bim	Gdy	4500	150	90
Republic 11X	2295	Cont N3 3/4	3 3/4 x5	22.5	L	T	Own	C	FS	Strm	G	Rug	Full	DD	Bos	.....	Full	U	3	Hart	Math	I	Torb	D	8	18.84	Jac	34x4	34x6	Nor	Fir	3400	144	....
Reynolds 3A	.....	HinHAA400	4 x5 1/4	25.6	L	C	Lng	Fin	F	Strm	G	Hink	Covt	DD	Bos	W	Covt	A	4	Sned	Per	W	Shel	.....	6.5	30.62	Lav	36x6*	38x7*	Smi	.....	.....	144	75
Rowe CW1½	3000	Wis CAU	3 3/4 x5	22.5	L	C	Fed	H	F	Zen	G	Sim	B-Li	DD	Bos	.....	B-Li	U	4	Spic	Shel	W	Shel	1/2 Fl	6.5	26	Ros	36x6*	36x6*	Hoo	.....	3800	133	69.1
Rumely A	2720	Buda CTU	3 3/4 x5 1/4	22.5	T	G	Mod	ZZT	F	Strm	G	Pier	Full	DP	Spl	.....	Full	U	3	Bld	Mat	W	Shel	1/2 Fl	7.8	31.2	Gem	36x3 1/2	36x5	.....	Gdy	4100	144	75
Sandow CG	2590	Cont N3/4	3 3/4 x5	22.5	L	T	.....	Fin	FS	Strm	G	.....	.....	DD	Eis	.....	Full	U	3	Spic	GC	W	Shel	.....	7.8	23	Ros	34x3 1/2	34x5	StM	.....	3300	135	70
Schwartz BI	2485	Cont N3/4	3 3/4 x5	22.5	L	T	Fed	H	FS	Strm	G	Mon	M-E	DP	Bos	.....	Dun	U	3	M-E	Row	I	Torb	.....	8	26.9	Ros	34x3 1/2	34x5	Sch	Fir	3750	140	....
Schwartz BW	2600	Buda CTU	3 3/4 x5 1/4	22.5	L	C	Fed	H	F	Strm	G	Mon	M-E	DP	Bos	.....	Dun	U	3	M-E	Row	W	Shel	.....	7.8	24.6	Ros	36x3 1/2	34x6	Sch	Fir	4400	140	....
Selden 1½A	2360	Cont N	3 3/4 x5	22.5	L	C	Lng	Fin	FS	Strm	G	Pier	B-Li	D	Eis	.....	B-Li	U	3	Spic	Per	W	Timk	1/2 Fl	7	23.31	Lav	34x3 1/2	34x5	Arc	.....	3560	137	57
Service 31	2985	Buda IU	4 x5 1/2	25.6	L	C	.....	Fin	F	Strm	V	.....	B.B.	DP	Eis	.....	.....	A	4	Spic	.....	W	Timk	.....	7.75	37.5	Ros	36x3 1/2	36x6	Bim	.....	4850	150	65
Service 36	3415	Buda HU	4 1/8x5 1/2	28. 9	L	C	.....	Fin	F	Strm	V	.....	B.B.	DP	Eis	.....	.....	A	4	Spic	.....	W	Timk	.....	7	33.8	Ros	35x5*	38x7*	Bim	.....	4900	150	65
Signal H	2925	Cont C4	4 1/8x5 1/4	27.2	L	C	McC	Fin	FS	Strm	G	Pier	B-Li	DD	Eis	.....	B-Li	A	4	Spic	Det	W	Timk	1/2 Fl	7.75	31	Ros	34x4	36x6	Hay	.....	4760	146	66
Southern 15	2590	Cont N	3 3/4 x5	22.5	L	T	R-T	PT	S	Zen	...	Pier	Full	DD	Bos	.....	Full	U	3	.....	Shel	W	Shel	.....	.....	.....	Ros	34x3 1/2	35x5	.....	.....	.....	144	70
*Sterling 1½	3200	Ster FU	4x5 1/4	25. 6	L	C	Own	C	F	Zen	V	Wau	B-Li	DD	Eis	.....	B-Li	U	4	Spic	Mat	W	Timk	1/2 Fl	7	37.45	Ros	36x3 1/2	36x5	Pru	.....	4720	142	91
Stewart 9	2200	Cont N3/4	3 3/4 x5	22. 5	...	T	Bus	PT	FS	Zen	G	.....	Full	DP	Eis	.....	Full	U	3	Hart	Det	I	Cl	D	7 6	22.8	Gem	34x3 1/2	34x5†	Way	Fir	3440	140	70
Stoughton B	2350	Wau BUX	3 3/4 x5 1/4	22. 5	L	C	Own	Fin	FS	Strm	G	Wau	B-Li	DD	Eis	.....	B-Li	U	3	Ther	Shel	W	Shel	1/2 Fl	7 8	31.2	Lav	36x3 1/2	36x5	Bim	Gdy	3800	140	71
Tiffin GW	2695	Cont C4	4 1/8x5 1/4	27. 2	L	C	Own	Fin	FS	Sheb	G	Pier	Full	DD	Bos	W	Full	U	3	Pet	Kal	W	Shel	.....	7.7	23.25	Ros	36x3 1/2	36x5	Smi	.....	3750	135	80
Tower J1½	3000	Cont C4	4 1/8x5 1/4	27. 2	L	C	Own	PT	S	Zen	G	.....	Full	DP	Eis	.....	Full	U	3	Bld	Det	W	Timk	1/2 Fl	7.25	29	Ros	35x5*	38x7*	Pru	Fir	4520	142	70
Transport 30	2250	.....	3 3/4 x5	22. 5	L	T	Mod	C	FS	Strm	G	Sim	Full	DD	Eis	.....	Full	U	3	Hart	Det	I	Cl	D	7.6	30.4	Jac	36x3 1/2	36x5	.....	Fir	3450	140	70
*Traylor B	2500	Buda WU	3 3/4 x5 1/2	22. 5	L	C	GO	Fin	F	Zen	G	Sim	Covt	DD	Spl	.....	Covt	U	3	M-E	Mer	W	Shel	1/2 Fl	7.8	.....	Ros	34x3 1/2	34x6	Sch	.....	4000	140	75
*Triangle A	2350	Wau BUX	3 3/4 x5 1/4	22.5	L	C	Per	ZZT	FS	Strm	G	Wau	Full	DD	Eis	.....	Full	U	3	UP	Det	I	Cl	.....	7.25	21	Gem	34x3 1/2	34x6	Roy	Fir	3750	144	60
Triumph H 1½	2400	Buda CTU	3 3/4 x5 1/4	22.5	L	C	Chic	Fin	F	King	V	Pier	B.B.	D	Spl	.....	Cott	U	4	UP	Tut	I	Rus	D	7.4	35.4	Lav	36x3 1/2	36x5	Stn	Stn	4100	144	70
Triumph HC 1½	2550	Buda CTU	3 3/4 x5 1/2	22.5	L	C	Chic	Fin	F	Strm	V	Pier	B.B.	D	Spl	.....	Cott	U	4	UP	Tut	I	Rus	D	7.4	35.4	Lav	36x3 1/2	36x5	Stn	Stn	4100	144	70

| | | |

Trade Name and Model	Chassis Price	ENGINE DETAILS: Make and Model Number 4 Cylinder unless otherwise noted	Bore and Stroke	N. A. C. C. Horsepower	Valve Arrange't	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	GEARSET: Make	Location	Speeds	Universal (Make)	Springs (Make)	REAR AXLE: Final Drive	Make	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	TIRES, WHEELS, RIMS: *Pneumatic †Dual Front	Rear	Wheels (Make)	Rim Equipment	Chassis Weight	Wheelbase	Pr. Cont of Weight on Rear Wheels
2 Ton—Con'd		1		2	3	4	5	6	7	8	9		10	11	12	13	14	15		16	17	18	19	20			21			22	23			
Penn B.	.....	Bud MU	3 5/8x5 1/2	21	L	C	GO	Pt	F	Zen	G	Pier	Full	D	Bos	Bos	Full	U	3	Spic	Row	W	Wis	.....	8.25	.....	Ros	34x5*	38x7*	Sch	Gdy	4200	144	70
Pierce Arrow X5	3750	Own	4 x5 1/2	25.6	T	C	.....	Fin	F	Strm	F	Own	.....	DD	Del	Opt	.....	A	4	.....	.....	W	.....	.....	8.33	43.3	.....	36x4	36x4†	Day	.....	6400	150	75
Rainier R18	2950	Cont C2	4 1/2x5 1/4	27.2	L	C	Har	H	FS	Zen	V	Mon	B-Li	DP	Eis	.....	B-Li	U	3	Hart	Per	W	Shel	.....	8.7	28.83	Ros	34x4	34x6	.....	Fir	3850	147	80
Ranger TK-20-2.	.....	Wis CAU	3 3/4x5	22.5	L	C	Bus	.....	F	Zen	G	Sim	.....	D	Spl	.....	Full	U	3	.....	Stan	W	Tim	½	9.25	29.97	Dit	36x6*	38x7*	Bim	Fir	3700	136	40
Reliance 20B.	3200	Buda HTU	4 1/4x5 1/2	28.9	L	C	Bus	PT	FS	Strm	G	Pier	Full	DD	Eis	.....	Cott	A	4	Pet	Shel	W	Badg	D	7.5	39	Ros	36x4	36x4†	Bim	Gdy	5500	156	90
Rowe CD W2	3300	Wis EAU	4 x5	25.6	L	C	Fed	H	F	Zen	G	Sim	B-Li	DP	Bos	.....	B-Li	U	4	Spic	Shel	W	Shel	½Fl	7.7	31	Ros	34x4	36x3 1/2†	Hoo	.....	4500	142	76.6
Sandow I.	2675	Cont N 3/4	3 3/4x5	22.5	L	G	Own	Fin	FS	Strm	G	.....	.....	DD	Eis	.....	Full	U	3	Spic	GC	W	Torb	D	10	30	Ros	36x4	36x6	Stn	.....	3800	150	70
Schacht.	3550	Buda HU	4 1/4x5 1/2	28.9	L	G	Own	PT	F	Sheb	G	Dup	Own	C	Bos	.....	Own	A	3	M&E	Nat	W	Own	Flot	.....	.....	Own	36x4	36x7	StM	.....	5500	156	70
*Southern 20.	2990	Buda HTU	4 1/4x5 1/2	28.9	L	T	Own	PT	S	Zen	...	Pier	Full	DD	Bos	.....	Full	U	4	.....	Shel	W	Shel	.....	.....	.....	Ros	36x4	36x7	.....	.....	.....	150	70
*Sterling 2.	3500	Ster FU	4x5 3/4	25.6	L	C	Own	C	F	Zen	V	Wau	B-Li	DD	Eis	.....	B-Li	U	4	Spic	Mat	W	Timk	Flot	7.7	37.45	Ros	36x4	36x6	Pru	.....	5000	142	91
Stewart 7.	2800	Cont C2	4 1/2x5 1/4	27.2	...	G	Bus	Fin	FS	Zen	G	Pier	Full	DP	Eis	.....	Full	U	3	Hart	Det	I	Cl	D	9	27	Ros	34x4	34x7†	Cla	Fir	4460	156	72
Stoughton D.	2800	Her CU3	4 x5 1/2	25.6	L	C	Own	Fin	F	Strm	G	Dup	B-Li	DD	Eis	.....	B-Li	U	4	Ther	Shel	I	Shel	½Fl	8.66	35	Lav	36x4	36x7	Bim	Gdy	4600	140	70
Superior E.	2750	Cont C2	4 1/2x5 1/4	27.2	L	A	Idl	C	F	Strm	V	Pier	Full	DD	Eis	.....	Full	U	3	Arv	Tut	I	Torb	C	8	23.2	Ros	36x4	36x6	Sch	Fir	3600	144	75
Traffic 4000C.	1595	Cont N4	3 3/4x5	22.5	L	T	Own	C	FS	Cart	G	.....	Covt	DP	Bos	.....	Covt	U	3	Ther	Det	I	Russ	.....	7	25.62	Own	34x3 1/2	34x5	Opt	Fir	3175	132	85
*Traylor C.	3000	Buda ITU	4 x5 1/2	25.6	L	P	GO	Fin	F	Zen	G	Pier	Covt	DD	Spl	.....	Covt	U	3	M-E	Mer	W	Shel	½Fl	7.75	.....	Ros	36x4	36x7	Sch	.....	5400	146	75
Triangle C.	2700	Wau BUX	3 3/4x5 1/2	22.5	L	C	Per	ZZT	FS	Strm	G	Wau	Full	DD	Eis	.....	Full	U	3	UP	Det	I	Cl	.....	9.1	27	Gem	36x4	36x6	Roy	Fir	4200	147	60
Triumph HB-2.	2900	Buda CTU	3 3/4x5 1/4	22.5	L	C	Chic	Fin	F	King	V	Pier	B.B.	D	Spl	.....	Cott	U	4	UP	Tut	W	Wis	½Fl	7.75	40.3	Lav	36x4	36x7	Stn	Stn	4900	144	70
*Twin City 2.	3000	Buda ITU	4x5 1/2	25.6	L	C	Mod	H	F	Sheb	V	Sim	Full	D	Bos	.....	Full	U	3	Arv	Math	I	Cl	.....	8	32	Ros	36x6*	40x8*	Bim	Fir	4800	150	80
*Ultimate AJ.	3250	Buda HTU	4 1/4x5 1/2	28.6	L	C	Own	Fin	F	Strm	G	Pier	B-Li	DD	Eis	Bos	B-Li	U	4	Spic	Shel	W	Shel	.....	6.5	.....	Ros	35x5*	38x7*	Jon	Fir	4500	156	72
*Ultimate AJL.	3300	Buda HTU	4 1/4x5 1/2	28.6	L	C	Own	Fin	F	Strm	G	Pier	B-Li	DD	Eis	Bos	B-Li	U	4	Spic	Shel	W	Shel	.....	6.5	.....	Ros	35x5*	38x7*	Jon	Fir	4590	156	72
Vim 22.	3150	Her CU2	3 3/4x5 1/2	22.5	L	G	MoC	PT	F	Zen	G	Dup	B-Li	D	Spl	.....	B-Li	U	4	Spic	Shel	W	Shel	.....	7.7	.....	Gem	36x4	36x6	Smi	.....	4700	142	....
*White 20.	3450	Own	3 3/4x5 1/2	22.5	L	C	..	C	FS	Own	G	.....	Own	D	.....	.....	.....	A	4	Own	.....	R	Own	½Fl	.....	.....	Own	36x4	36x7	.....	Fir	4500	157	....
Wichita M.	2800	Wau BX	3 3/4x5 1/4	22.5	L	G	Per	PT	F	Strm	G	Wau	Own	C	.....	.....	B-Li	A	4	Own	Det	W	Shel	½Fl	8.6	45.03	Ros	36x3 1/2	36x6	Bim	Fir	4400	144	80
Winther 49.	3250	Wis EAU	4 x5	25.6	L	G	Brm	PT	F	Mas	V	.....	B.B.	DP	Eis	W	B-Li	A	4	Bld	Math	I	Cl	D	9	39	Ros	34x4	34x4†	Own	.....	5300	150	80
Witt Will P.	3250	Cont C4	4 1/2x5 1/4	27.2	H	G	Mod	C	FS	Zen	G	Pier	B-Li	DD	Eis	.....	B-Li	U	3	Spic	Del	W	Tim	.....	7.75	.....	Ros	36x3 1/2	36x7	Arc	.....	5000	144	70
Wolverine J.	2695	Cont J	3 3/4x5	22.5	L	C	.....	PT	F	Strm	G	Phar	.....	D	Eis	Bj	.....	.....		UP	Tut	I	Russ	D	8.2	12.2	Gem	34x4	34x7	Hay	Gdy	3800	148	70
Young 6.	3100	Cont K-4	4 1/2x5 1/4	27.2	L	C	Whee	Fin	F	Sch	G	.....	B-Li	D	Eis	.....	B-Li	U	3	Spic	Math	W	Timk	Flot	.....	.....	Ros	36x4	36x7	StM	.....	4500	144	75
2½ Ton																																		
Acason H.	3295	Wau CU	4 3/8x5 3/4	30.6	L	P	Can	C	FS	Sheb	V	Wau	Det	.....	Eis	.....	Cott	A	4	Bld	Det	W	Timk	.....	7.75	40.3	Ros	36x4	36x8	Smi	Opt	5400	150	....
Ace 2½.	.....	Buda HU	4 1/4x5 1/2	28.9	L	C	Mod	ZZT	F	Sheb	G	Pier	Full	DP	Eis	W	Full	A	4	UM	Math	W	Timk	Flot	8.50	34	Ros	36x4	36.7	Day	Fir	5630	156	80
American.	3575	Wis	4 x6	25.6	L	G	GO	Fin	F	Strm	G	Own	Det	D	Eis	.....	Cott	U	4	Acm	SP	W	Thom	Flot	8.33	.....	Ros	36x4	34x4†	.....	.....	5000	158	....
Apex E.	2695	Buda HU	4 1/4x5 1/2	28.9	L	C	GO	C	F	Strm	V	Dup	Full	D	Eis	Op	Full	U	3	Bld	Det	I	Torb	D	9	27	Lav	36x4	36x7	Roy	Fir	4500	150	70
*Armleder HW.	.....	Buda & Cont	4 1/4x5 1/2	28.9	L	P	Lng	Fin	F	Zen	G	.....	B-Li	DD	Bos	W	B-Li	U	4	Spic	Math	W	Timk	Flot	9.25	49.5	Ros	36x4	36x7	StM	.....	4650	148	80
Atco A.	.....	Bud HU	4 1/4x5 1/2	28.9	L	C	Chic	PT	F	Strm	G	Pier	Full	D	Eis	W	Full	A	4	Hart	Shel	W	Wis	.....	8.7	41.6	Ros	36x4	36x7	Smi	.....	4900	150	....
Atterbury 7CX LWB.	3475	Cont C4	4 1/2x5 1/4	27.2	L	C	Own	Fin	S	Zen	G	Mon	B-Li	DD	Ber	.....	B-Li	U	4	Spic	SP	W	Timk	Flot	9.25	44.77	Gem	36x4	36x4†	Arc	Fir	5520	171	74.5
Atterbury 7CX STD.	3375	Cont C4	4 1/2x5 1/4	27.2	L	C	Own	Fin	S	Zen	G	Mon	B-Li	DD	Ber	.....	B-Li	U	4	Spic	SP	W	Timk	Flot	9.25	44.77	Gem	36x4	36x4†	Arc	Fir	5360	153	74.5
*Available 2½.	3475	Her CU3	4 x5 1/2	25.6	L	C	Chic	Fin	FS	Strm	V	Pier	B-Li	DD	Bos	.....	B-Li	A	4	M-E	Tut	W	Timk	Flot	7.75	40.3	Ros	36x4	36x8	Sch	.....	4750	152	75
Bell O.	2750	Buda HU	4 1/4x5 1/2	28.9	L	C	Chic	PT	F	Strm	V	Dup	B.B.	DP	Eis	.....	Det	U	3	UP	Det	Opt	Opt	Opt	8	38.4	Gem	34x4	34x7	Bim	Fir	4200	146	65
Bessemer J2.	.....	Cont C4	4 1/2x5 1/4	27.2	L	C	.....	C	FS	Strm	G	Pier	B B.	DP	Bos	.....	B-Li	A	4	Arv	Per	I	Torb	D	8	32	Ros	36x4	36x4†	Sch	Fir	4600	158	67
Bridgeport 2½B.	2850	Buda HTU	4 1/4x5 1/2	28.9	L	G	Own	Fin	FS	Strm	...	Pier	B.B.	D	Eis	.....	Cott	U	4	Hart	Per	W	Timk	.....	8.25	.....	Ros	36x4	36x7	Arc	.....	5500	156	70
Brinton F.	3400	Cont C4	4 1/2x5 1/4	27.2	L	C	Chic	PT	F	Strm	G	Pier	B-Li	D	Bos	.....	B-Li	U	3	Spic	Tut	W	Timk	Flot	.....	33.6	Ros	36x4	36x6	Smi	.....	4600	150	....
Brockway K5.	3200	Cont K4	4 1/2x5 1/4	27.2	L	C	Bus	Fin	F	Strm	V	Phar	B-Li	DD	Eis	.....	B-Li	A	4	Spic	Mer	W	Timk	Flot	7.75	41.5	Gem	36x4	36x7	Hoo	.....	4950	152	70
Capitol H 2½.	3700	Wis UAU	4 1/4 x6	28.9	L	C	GO	Fin	F	Strm	G	Sim	Det	DD	Bos	.....	Cott	U	4	Spic	Sp	W	Wis	½Fl	8.66	45	Ros	36x4	36x8	.....	.....	5200	156	85
Capitol K2½.	4250	Wis UAU	4 1/4 x6	28.9	L	C	GO	Fin	F	Strm	G	Sim	Det	DD	Bos	W	Cott	U	4	Spic	SP	W	Wis	½Fl	7.25	37.7	Ros	36x6*	42x9*	.....	Fir	5100	156	85
Chicago C2½.	.....	Her CU3	4 x5 1/2	25.6	L	C	.....	PT	F	Strm	G	Sim	B-Li	D	Bos	.....	B-Li	U	4	Pet	Math	W	Timk	Flot	8.5	34	Gem	36x4	36x7	Opt	Stn	4500	156	....
Clydesdale 65EC.	3775	Own MU3	4 1/2x5 1/2	32.4	L	G	Own	PT	F	Zen	V	Own	B-Li	DD	Bos	.....	B-Li	A	4	Spic	Stan	W	Timk	Flot	8.5	41.1	Ross	36x4	36x7	Smi	.....	5900	163	73
Collier 22	.....	Cont C4	4 1/2x5 1/4	27.2	T	C	Lng	PT	FS	Zen	V	Pier	Full	DP	Eis	.....	Full	U	4	UP	Math	W	Timk	.....	8.5	40.8	Ros	36x4	36x4†	Bim	Fir	5445	165	70
Columbia G.	2850	Hink HAA	4 x5 1/4	25.6	L	C	Lng	Fin	F	Strm	V	Hink	M-E	DP	Spl	.....	Cott	A	4	Spic	Per	I	Russ	.....	9.5	48.8	Own	36x4	36x7	Det	Fir	4400	148	40
Concord B.	3600	Buda HTU	4 1/4x5 1/2	28.9	L	C	Bus	PT	F	Zen	G	Mon	B-Li	DP	Eis	.....	B-Li	U	4	Spic	Per	W	Timk	Flot	9.25	37	Ros	36x4	36x8	Arc	Fir	5400	150	70
Corbitt B.	3650	Cont C4	4 1/2x5 1/4	27.2	L	C	Lng	Fin	FS	Strm	V	Sim	B-Li	DD	Eis	.....	B-Li	U	4	Hart	Shel	W	Shel	½Fl	8.7	35	Ros	36x4	36x7	Bim	Fir	5325	152	75
Dart M.	.....	Buda HU	4 1/4x5 1/2	28.9	L	C	Own	C	F	Zen	G	Pier	Full	DD	Eis	.....	Full	U	4	Spic	Per	W	Own	.....	8.5	40.8	Ros	36x4	36x7	Pru	.....	4800	150	80
Day Elder C.	3125	Buda HTU	4 1/4x5 1/2	28.9	L	C	Bus	Fin	F	Zen	G	Mon	Covt	DD	Eis	.....	Covt	U	4	Hart	IC	W	Shel	½Fl	8.75	41.56	Gem	36x4	36x7	Jon	Fir	5000	150	70
Dependable E 2½.	2950	Buda HTU	4 1/4x5 1/2	28.9	L	C	Lng	Fin	F	Zen	V	Mon	Full	DD	Spl	AL	Full	A	4	Acm	Per	W	Wis	½Fl	8.6	40	Ros	36x4	36x7	Bim	Fir	5800	155	70
Doane 2½.	4100	Wau RU	4 1/4x5 1/4	28.9	...	C	Own	PT	S	Mas	G	Wau	B-Li	DD	Bos	.....	B-Li	U	3	Own	Own	C	Own	D	7.7	30.8	Lav	36x5	36x7	Wes	.....	5000	147	79
*Erie 2½.	.....	Buda HTU	4 1/4x5 1/2	28.9	L	C	Fed	C	FS	Strm	G	Sim	Full	D	Bos	.....	Full	A	4	Spic	Per	W	Shel	.....	.....	.....	Ros	36x6*	36x8*	Way	Fir	5760	150	80
Facto.	2895	Buda ETU	4 1/4x5 1/2	28.9	L	C	Bus	PT	...	Zen	V	Pier	Full	D	Spl	.....	Full	A	4	Spic	SP	W	Timk	.....	7.75	37.14	Ros	36x4	36x8	Smi	Fir	5800	155	....
*Fageol 3400.	.....	Wau CU	4 3/8x5 3/4	30.6	L	C	Mod	C	F	Zen	V	Wau	Det	DD	Spl	.....	Own	A	5	Spic	Math	W	Timk	Flot	5.6	59.5	Ros	36x4	36x7	Stn	.....	4600	144	80
Gary J	3150	Buda HTU	4 1/4x5 1/2	28.9	L	C	Chic	Fin	F	Mas	V	McC	Full	DD	Eis	.....	Full	U	4	Hart	Det	W	Timk	Flot	8.5	41	Ros	36x4	36x7	Pru	Gdy	4850	148	70
Gersix K.	3500	Buda HTU	4 1/4x5 1/2	28.9	L	C	Idl	C	F	Strm	V	Mon	B.B.	....	Bos	.....	Cott	U	3	Bld	Tut	W	Own	.....	9.6	39	Ros	36x4	36x8	Jon	.....	5200	150	75
*Giant 16.	3250	Cont C4	4 1/2x5 1/4	27.2	L	P	Own	.....	FS	Sheb	G	Mon	B-Li	DD	Eis	.....	B-Li	U	3	Spic	Math	W	Timk	.....	8.8	29.09	Ros	36x4	36x7	Way	.....	4500	168	80
*Giant 16.	3150	Cont C4	4 1/2x5 1/4	27.2	L	P	Own	.....	FS	Sheb	G	Mon	B-Li	DD	Eis	.....	B-Li	U	3	Spic	Math	W	Timk	.....	8.8	29.9	Ros	36x4	36x7	Way	.....	4500	144	80
Gove A1.	.....	Cont C4	4 1/2x5 1/4	27.2	L	C	.....	C	S	Stew	V	Pier	Full	D	Eis	.....	Full	U	4	Hart	Det	I	Torb	.....	8	38.4	Lav	36x4	36x7	Pru	.....	4400	144	....
Gramm-Bernstein 25.	3575	Hink	4 1/4x5 1/2	28.9	L	C	Own	Fin	F	Strm	V	Hink	Own	DD	Eis	NE	Own	A	4	Own	Per	W	Eat	½Fl	7.7	36.7	Ros	36x4	36x4†	Smi	Fir	6800	150	91.3
Hahn EE	.....	Cont E4	4 1/2	32.4	L	C	Own	Fin	F	Strm	G	Pier	.....	DD	Bos	.....	B-Li	...	3	Spic	....	W	Timk	.....	7.7	.....	Ros	36x4	36x8	.....	.....	4800	145	65
Hall 2½ Worm	3275	Cont C4	4 1/4x5 1/4	27.2	L	C	Own	H	FS	Zen	G	Dup	B-Li	DP	Bos	.....	B-Li	U	3	Opt	Det	W	Timk	.....	7.7	.....	Gem	36x4	36x4	Smi	.....	4825	Op	....
Harvey WFA.	3300	Buda HU	4 1/4x5 1/2	28.9	L	C	.....	ZZT	FS	Strm	G	Mon	B.B.	DP	Eis	.....	B-Li	A	4	Spic	Shel	W	Shel	.....	7.7	31	Ros	36x4	36x7	Sch	.....	5300	150	80
*Hendrickson I	3150	Buda HU	4 1/4x5 1/2	28.9	L	C	Chic	Pt	F	Strm	G	McC	Full	D	Spl	.....	Full	A	4	Ther	Tut	W	Timk	.....	7.7	37.2	Ros	36x4	36x7	Stn	.....	.....	Op	80
Hewitt Ludlow Worm	.....	Buda HU	4 1/4x5 1/2	28.9	...	C	Mod	Fin	...	Strm	V	.....	B-Li	DP	Bos	.....	B-Li	...	4	Spic	....	W	Shel	½Fl	.....	.....	Ros	36x4	36x7	.....	.....	5500	150	....
H. R. L., H.	3650	Hink HAA	4 x5 1/4	25.6	L	C	Fed	Fin	F	Zen	V	Hink	B-Li	DP	Bos	GD	B-Li	U	4	Spic	Shel	W	Shel	.....	8.75	30.	Ros	36x4	36x4†	Sch	Gdy	5310	154	....
Hurlburt 2½.	3750	Buda HU	4 1/4x5 1/2	28.9	L	C	Own	.....	F	Flch	G	Dup	B-Li	D	Eis	.....	B-Li	U	3	Spic	Per	W	Own	.....	.....	.....	Ros	36x4	36x4	Way	.....	5600	170	85
Huron-Michigan	.....	Buda ETU	4 1/4x5 1/2	28.9	L	C	.....	Fin	F	Zen	V	Pier	B.B.	D	Bos	.....	Cott	U	4	Det	Det	I	Cl	.....	8	41.6	Jac	36x6	40x8	AuW	Fir	.....	150	90
Independent H1 (Iowa)	2940	Cont C4	4 1/2x5 1/4	27.2	L	C	GC	PT	FS	Strm	V	.....	Full	DD	Bos	.....	Full	U	4	Bld	GC	I	Russ	D	10	.....	Lav	36x4	36x7	StM	Fir	4950	154	75
Independent H (Ohio)	3285	Cont K4	4 1/2x5 1/4	27.2	L	G	Lng	PT	F	Strm	G	.....	Full	DP	Eis	.....	Full	A	4	Spic	Math	W	Wis	.....	9.6	39	Ros	36x4	36x8†	.....	.....	4600	148	85
Indiana 25.	.....	Own 38	4 1/4x5 1/2	27.2	L	C	McC	Fin	F	Strm	G	Pier	B.B.	DD	Eis	.....	B-Li	A	4	Spic	Shel	W	Shel	½Fl	7.75	39.5	Woh	36x4	36x8	Day	.....	5850	156	73
Jumbo 25.	3090	Buda HU	4 1/4x5 1/2	28.9	L	C	Own	Fin	F	Zen	V	Sim	Full	D	NE	.....	Full	U	4	Arv	Per	I	Cl	D	9	43.2	Jac	36x4	36x7	Day	.....	5190	152	75
Kalamazoo H.	3700	Wis TAU	4 x6	25.6	L	G	GO	PT	F	Strm	V	Pier	Full	D	Bos	Dy	Full	U	4	Acm	Shel	W	Shel	½Fl	8.75	42.8	Ros	36x4	36x8	Smi	.....	6200	160	80
Kankakee 2½.	3175	Cont 6 9N	3 1/2x5 1/4	29.4	L	C	Spli	H	FS	Zen	V	.....	W-Gr	DD	Del	DL	W-Gr	U	3	Acm	Tem	I	Russ	D	7.4	22.2	Ros	36x6*	40x8*	Bim	Gdy	4200	Op	70
Karavan.	.....	Buda X TU	4 1/4 x6	28.9	L	C	Fed	ZZT	F	Zen	G	Dup	B-Li	DD	Ber	.....	B-Li	A	4	Spic	Shel	W	Shel	.....	7.75	37.51	Ros	36x4	36x8	Smi	.....	5700	148	80

| | | |

Trade Name and Model	Chassis Price	ENGINE DETAILS: Make and Model Number 4 Cylinder unless otherwise noted	Bore and Stroke	N. A. C. C. Horsepower	Valve Arrange't	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	GEARSET: Make	Location	Speeds	Universal (Make)	Springs (Make)	REAR AXLE: Final Drive	Make	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	TIRES, WHEELS, RIMS: *Pneumatic †Dual Front	Rear	Wheels (Make)	Rim Equipment	Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels
3 Ton—Con'd		1		2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20			21			22	23			
U. S., R.	.....	Own	4 x5¼	25.6	...	C	Lng	Fin	F	Strm	V	Own	B-Li	DD	Eis	Op	B-Li	A	4	Opt	Shel	W	Shel	½Fl	8.7	41.5	Lav	36x4	36x4†	Sch	.....	5500	156	85
Vim 23	3950	Her MU2	4¼x5½	28.9	L	C	MeC	Fin	F	Zen	G	Dup	B-Li	D	Spl	.....	B-Li	A	4	Spic	Shel	W	Shel	.....	7.7	.....	Gem	36x5	36x5†	Smi	.....	6370	175	....
*Wichita RX	3600	Beav JA	4¼x6	28.9	H	G	Per	PT	F	Strm	G	Dup	Own	C	Ber	B-Li	.....	A	4	Own	Det	W	Shel	½Fl	8.75	55.5	Ros	36x4	36x8	Smi	Fir	5900	160	80
3½ Ton																																		
Acason L	4295	Wau CU	4⅜x5¾	30.6	L	G	Can	C	FS	Sheb	V	Wau	Det	.....	Eis	.....	Cott	A	4	Bld	Det	W	Timk	.....	8.75	48.5	Ros	36x5	36x5†	Smi	Opt	7000	180	....
*Acme C	.....	Cont L4	4½x5½	32.4	L	C	GO	Fin	F	Rayf	V	Dup	B B.	DP	Eis	....	Cott	A	4	Bld	Det	W	Timk	Flot	10.3	53.73	Ros	36x5	40x5†	Bim	.....	6650	168	56
Apex F	3975	Buda YTU	4½x6	32.4	L	C	GO	C	F	Strm	V	Dup	Full	D	Eis	Opt	Full	A	4	Bld	Det	....	Torb	D	10.5	.....	Woh	36x5	36x10	Roy	Fir	6940	168	....
*Armleder KW		Buda & Cont	4½x6	32.4	L	P	Own	Fin	F	Zen	G	....	B-Li	DD	Bos	....	B-Li	U	4	Spic	Math	W	Timk	Flot	10.33	55.25	Ros	36x5	36x5†	StM	.....	6800	156	80
Atterbury 7D-LWB	4275	Cont E4	4½x5½	32.4	L	C	Own	Fin	S	Zen	G	Mon	B-Li	DD	Ber	....	B-Li	U	4	Spic	SP	W	Timk	Flot	10.3	49.85	Gem	36x5	40x5†	Arc	Fir	7270	192	76
Atterbury 7D-Standard	4175	Cont E4	4½x5½	32.4	L	C	Own	Fin	S	Zen	G	Mon	B-Li	DD	Ber	....	B-Li	U	4	Spic	SP	W	Timk	Flot	10.3	49.85	Gem	36x5	40x5†	Arc	Fir	6950	167	76
*Autocar Y	4350	Own Y	4¼x5½	28.9	L	C	Own	Fin	S	Strm	G	Dup	Own	DP	...	....	Own	A	4	.....	.....	R	Own	Flot	8.7	43.5	Ros	34x5	36x10	Hoo	.....	7150	120	65
*Autocar B	4500	Own B	4¼x5½	28.9	L	C	Own	Fin	S	Strm	G	Dup	Own	DP	...	....	Own	A	4	.....	.....	R	Own	Flot	8.7	43.5	Ros	34x5	36x10	Hoo	.....	7000	156	65
*Available H3½	4475	Her MU3	4½x5½	32.4	L	C	Chic	Fin	FS	Strm	V	Pier	B-Li	DD	Bos	....	B-Li	A	4	M-E	Tut	W	Timk	Flot	10.33	49.99	Ros	36x5	40x5†	Sch	.....	6500	176	75
Belmont D	.....	4 x6	25.6	...	...	...	...	...	...	Zen	PT	Pier	B.B.	DP	...	...	...	U	4	...	Math	...	...	...	...	...	...	38x7*	42x9*	...	.....	.....	162	....
Brockway R-4	4100	Cont L4	4½x5½	32.4	L	C	Bus	Fin	F	Strm	V	Phar	B-Li	DD	Eis	....	B-Li	A	4	Spic	Mer	W	Timk	Flot	8.75	46.8	Gem	36x5	36x5†	Smi	.....	6800	164	70
Capitol M-3½	4425	Wis UAU	4¼x6	28.9	L	C	GO	Fin	F	Strm	G	Sim	Det	DD	Bos	....	Cott	U	4	Spic	SP	W	Wis	½Fl	9	46.8	Ros	36x5	36x10	Smi	.....	6400	168	85
Chicago C3½	.....	Her MU3	4½x5½	32.4	L	C	.....	PT	F	Strm	G	Sim	B-Li	D	Bos	....	B-Li	A	4	Pet	Math	W	Timk	Flot	10.33	50	Gem	36x5	36x10	Opt	Sta	6900	168	....
Clydesdale 90C	4400	Own MU3	4½x5½	32.4	L	C	Own	PT	F	Zen	V	Own	B-Li	DD	Bos	....	B-Li	A	4	Spic	Stan	W	Timk	Flot	10 33	55.2	Ros	36x5	40x10	Smi	.....	7500	170	78
Corbitt A	4500	Cont E4	4½x5½	32.4	L	G	MeC	Fin	FS	Strm	V	Pier	B-Li	DD	Eis	....	B-Li	U	4	Hart	Shel	W	Shel	½Fl	11.75	47	Ros	36x5	36x10	Smi	.....	7370	178	75
Couple Gear HC	6100	Wis	5.1x5½	41.9	T	C	Idl	H	F	Strm	G	.....	.....	.....	Eis	.....	Own	...	...	Own	Tut	B	Own	.....	.....	.....	Own	36x4†	36x4†	Own	Own	9000	144	57
Dart W	.....	Buda YTU	4½x6	32.4	L	C	Own	C	F	Zen	G	Pier	Full	DD	Eis	.....	Full	A	4	Spic	Per	W	Own	.....	8.7	52.5	Ros	36x5	36x10	Pru	.....	6740	160	75
Day Elder F	3950	Cont E4	4½x5½	32.4	L	C	Bus	Fin	FS	Zen	G	Mon	B-Li	DD	Fis	....	B-Ji	U	4	Hart	IC	W	Shel	½Fl	10.25	41	Gem	36x5	36x5†	Jon	Fir	5750	165	70
Dependable G 3½	3550	Buda YTU	4½x6	32.4	L	C	Lng	Fin	F	Zen	V	Mon	Full	DD	Spl	AL	Full	A	4	Acm	Per	W	Wis	½-Fl	10	47.61	Ros	36x6	36x10	Bim	Fir	6000	160	75
Diamond T-K	4675	Hin	4¼x5½	28.9	L	C	GO	Fin	F	Strm	V	Own	Covt	DD	Bos	....	Covt	A	4	Spic	Math	W	Timk	Flot	8.8	44.36	Gem	36x5	36x5†	....	.....	7250	170	....
Doane 3½	5100	Wau CU	4⅜x5¾	30.6	L	C	Own	PT	F	Mas	G	Wau	B-Li	DD	Bos	....	B-Li	U	3	Own	Own	C	Own	D	9.5	38	Lav	36x5	36x5†	Wes	.....	7000	169	79
Dorris K7	1400	Own	4¼x5½	28.9	H	C	MeC	Fin	F	Strm	G	Own	Own	DP	Bos	....	W-Gr	A	4	Spic	Row	W	Timk	Flot	10.33	51.5	Ros	36x5	36x10	Smi	.....	6750	194	70
Duplex E	4250	Buda TU	4¼x5½	28 9	H	C	Lng	ZZT	FS	Sheb	G	Pier	B-Li	DD	Eis	....	B-Li	U	4	Pet	Tut	I	Own	D	8	32	Woh	36x8	36x8	Pru	.....	6050	130	60
*Fageol 4500	.....	Wau DU	4½x6¼	32.4	L	C	Mod	C	F	Zen	V	Wau	Det	DD	Spl	....	Own	A	5	Spic	Math	W	Timk	Flot	7.4	79	Ros	36x5	40x5	Stn	.....	7300	172	80
Federal WE	3950	Cont E4	4½x5½	32.4	L	C	Own	Fin	FS	Zen	G	Phar	B.B.	DP	Eis	....	Own	A	4	Spic	Math	W	Timk	Flot	10.33	51.56	Gem	36x5	36x5†	Smi	Fir	6990	156	74.5
*Garford 77D	.....	Buda YTU	4½x6	32.4	L	C	Own	Fin	F	Strm	G	Sim	.....	DD	Spl	....	Own	A	4	Spic	Per	W	Timk	Flot	8 7	.....	Ros	36x5	36x5†	Smi	.....	7700	162	....
Gary KT	4050	Buda YTU	4½x6	32.4	L	C	Chic	Fin	F	Mas	G	MeC	B-Li	DD	Eis	....	B-Li	A	4	Hart	Det	W	Timk	Flot	10 33	41.32	Ros	36x5	40x5†	Pru	.....	7000	162	70
*Giant 17	4250	Cont E4	4½x5½	32.4	L	P	Own	....	B	Strm	G	Mon	.....	DD	Eis	....	B-Li	A	4	Spic	Shel	W	Timk	.....	10.25	49.61	Ros	36x5	36x5†	Way	.....	6800	176	70
G. M. C. K-71	.....	Own	4½x6	32.4	L	B	Own	Fin	F	Mar	G	Own	Own	DD	Eis	Opt	Own	A	7	Own	Det	W	Timk	Flot	8.75	75.2	Ros	36x5	40x5†	Own	.....	7714	Op	Opt
Gramm-Bernstein 35	4375	Hink	4½x5½	32.4	L	C	Own	Fin	F	Strm	V	Hink	Own	DD	Eis	NE	Own	A	4	Own	Per	W	Eat	½Fl	8.7	50.6	Ros	36x5	40x5†	Smi	Fir	8350	156	91.7
Hahn F	.....	Cont E4	4½x5½	32.4	L	C	Own	PT	F	Strm	...	Pier	....	DD	Bos	....	B-Li	A	4	Spic	....	W	Timk	....	10	.....	Ros	36x5	36x5†	....	....	6600	Op	65
Hal-Fur B	3250	Hin HA-500	4¼x5½	28.9	L	G	GO	PT	F	Strm	V	Hin	B.B.	P	Bos	W	B-Li	A	4	Pet	Per	W	Timk	Flot	7.75	57.4	Gem	35x5*	Opt	Smi	Fir	5000	Op	70
Hal-Fur F	4250	Hin AA 1600	4½x5½	32.4	H	...	GO	PT	F	Strm	V	Hin	B.B.	DP	Bos	W	Own	A	4	Pet	Mer	W	Timk	Flot	10.33	72	Gem	36x6	40x10	....	.....	6500	180	70
Hall 3½ Worm	4100	Cont E4	4½x5½	32.4	L	T	Own	PT	FS	Zen	G	Dup	B-Li	DP	Bos	....	B-Li	A	..	Opt	Det	W	Timk	.....	10	.....	Gem	36x5	36x5†	Smi	.....	6825	Op	....
Harvey WHA	4300	Buda YU	4½x6	32.4	L	G	...	Fin	FS	Strm	G	Mon	B R.	...	Eis	....	B-Li	A	4	Spic	Shel	W	Shel	.....	8.7	42.35	Ros	36x5	36x5†	Smi	.....	7700	160	80
Hawkeye N	4345	Buda YTU	4½x6	32.4	L	C	Idl	.....	F	Zen	...	Sim	Full	DD	Eis	....	Cott	A	4	Hart	Det	I	Cla	D	10	52	Ros	36x5	36x10	Bim	Fir	7000	170	72
*Hendrickson J	3975	Buda HTU	4¼x5½	28.9	L	C	Chic	Pt	F	Strm	G	MeC	Full	D	Spl	....	Full	A	4	Ther	Tut	W	Timk	.....	10	49.6	Ros	36x5	36x5.	Stn	.....	....	Op	80
Hewitt-Ludlow	....	Buda YTU	4½x6	32.4	...	...	Mod	Fin	...	Strm	...	...	B-Li	DP	Bos	....	...	...	4	Spic	....	...	Shel	½Fl	.....	.....	Ros	36x5	36x5†	....	.....	7500	156	....
Hurlburt	4590	Buda YTU	4½x6	32.4	L	C	Own	....	FS	Flch	G	Dup	B-Li	D	Eis	....	B-Li	A	4	Spic	Per	W	Own	Flot	8.7	41.91	Ros	36x5	36x5	Way	.....	7400	156	....
Independent K, (Ohio)	4285	Cont L4	4½x5½	32.4	L	C	Lng	PT	...	Strm	G	....	Full	DP	Eis	....	Full	U	4	Spic	Mat	W	Wis	....	10	48	Ros	36x5	36x10†	....	.....	5400	160	85
Indiana 35	.....	Own 40	4⅜x5½	30.6	L	C	MeC	Fin	F	Strm	G	Pier	B.B.	DD	Eis	....	B-Li	A	4	Spic	Shel	W	Shel	½Fl	10.2	49.6	Woh	36x5	36x5†	Smi	.....	7050	160	75
Jackson B	4550	Cont E4	4½x5½	32.4	L	C	Lng	Fin	FS	Strm	V	Pier	B.B.	DP	Eis	Dy	Own	A	4	Spic	Per	B	Own	Flot	9.2	43.49	Ros	36x7	36x7	....	.....	7400	150	65
Jumbo 35	4080	Buda YTU	4½x6	32.4	L	C	Own	Fin	F	Zen	G	Sim	B-Li	D	Eis	....	B-Li	U	4	Spic	Per	I	Cl	D	9	48.15	Jac	36x5	36x10	Day	.....	7510	165	75
Kalamazoo K	4300	Wis UAU	4¼x6	28.9	L	C	GO	PT	F	Strm	V	Pier	Full	D	Bos	Dy	Full	A	4	Acm	Shel	W	Shel	½Fl	10.25	49.8	Ros	36x5	36x5†	Smi	.....	7500	160	80
Kelly-Springfield K-40	4200	Own	4½x6½	32.4	T	C	Lng	Fin	F	Zen	G	Pier	Own	C	Eis	W	Covt	A	3	Own	Per	C	Own	D	10.49	31.69	Gem	36x5	40x5†	StM	.....	7730	150	93
Kelly-Springfield K-41	4200	Own	4½x6½	32.4	T	C	Lng	Fin	F	Zen	G	Pier	B.B.	D	Eis	W	Covt	A	4	Pet	Per	I	Cl	D	10	50.7	Gem	36x5	40x5†	Cla	.....	7900	156	90
Kelly-Springfield K-42	4200	Own	4½x6½	32.4	T	C	Lng	Fin	F	Zen	G	Pier	B.B.	D	Eis	W	Covt	A	4	Pet	Per	W	Eat	½Fl	10.25	51.97	Gem	36x5	40x5†	Smi	.....	8500	156	90
Kleiber C	4900	Cont E4	4½x5½	32.4	L	G	RT	PT	...	Strm	G	...	.....	WD	Bos	....	B-Li	A	4	Spic	....	W	Timk	Flot	8.75	42.35	Ros	36x5	36x10	Smi	.....	7200	163	75
*Koehler F	.....	Her	4 x5⅛	25.6	...	G	Own	PT	F	Zen	G	Pier	B-Li	DD	Eis	....	B-Li	A	4	...	Math	W	Timk	Flot	10.33	.....	Lav	36x5	36x10	....	.....	7000	162	75
Larrabee-Deyo L	4200	Cont E4	4½x5½	32.4	L	C	Bus	Fin	S	Sheb	G	Sim	B-Li	DD	Bos	....	B-Li	A	4	Opt	Mer	W	Shel	½Fl	10	41	Ros	36x5	36x5†	Smi	.....	6850	186	....
Maccar M2	4500	Wis VAU	4½x6	32.4	L	C	Own	Fin	F	Strm	G	Pier	B-Li	DD	Eis	....	B-Li	U	4	Spic	Mer	W	Timk	Flot	8.75	46.81	Ros	36x5	36x5†	Day	Fir	6500	174	80
Mack AC 3½	4950	Own AC	5 x6	40	L	C	Own	Fin	S	Sheb	G	Own	Own	DP	Spl	....	Own	UJ	3	Spic	Mer	C	Own	D	8.49	27.20	Own	36x5	40x5†	Sch	.....	8070	Op	65
Master A	4190	Buda YTU	4½x6	32.4	L	C	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	....	B-Li	A	4	Spic	Det	W	Timk	Flot	10.25	41.32	Ros	36x5	40x5†	Smi	.....	7000	158	72
Master AL	4290	Buda YTU	4½x6	32.4	L	C	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	....	B-Li	A	4	Spic	Det	W	Timk	Flot	10	41.32	Ros	36x5	40x5†	Smi	.....	7200	194	72
Master E	4640	Buda YTU	4½x6	32.4	L	C	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	....	B-Li	A	4	Spic	Det	R	Walk	Flot	11.5	46	Ros	36x5	40x5†	Wal	.....	7000	158	72
Master EL	4740	Buda YTU	4½x6	32.4	L	C	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	....	B-Li	A	4	Spic	Det	R	Walk	Flot	11.5	46	Ros	36x5	40x5†	Wal	.....	7200	194	72
*Menominee G	4270	Wis VAU	4½x6	32.4	L	C	Own	Fin	FS	Strm	G	Mon	Det	DP	Eis	Opt	Cott	A	4	Spic	Tut	W	Timk	.....	10.3	56.16	Ros	36x5	36x10†	Stn	Fir	....	160	80
Nelson & LeMoon F 3½	.....	Cont E4	4½x5½	32.4	T	C	Chic	Fin	S	Strm	G	Mon	B-Li	DD	Bos	W	B-Li	U	4	Own	Tut	W	Timk	.....	8.7	42	Lav	36x5	36x5†	Pru	Gdy	6000	Op	80
Noble E70	.....	Buda YTU	4½x6	32.4	L	C	Chic	Fin	F	Strm	G	Pier	Full	DP	Eis	W	W-Gr	A	4	M-E	Tut	W	Shel	½Fl	8.7	42	Lav	36x5	36x10	Bim	Fir	7500	182	85
Northway B3	.....	Own	4 x6	25.6	H	G	GO	C	F	Strm	V	Pier	Full	DP	Wag	W	Full	U	4	Spic	Per	W	Shel	½Fl	10	49.2	Ros	36x5	40x5†	Cla	.....	7700	Op	72
O. K. 3½ T	4250	Buda YTU	4½x6	32.4	L	G	RT	PT	FS	Zen	V	Pier	Full	DD	Eis	.....	Full	A	4	Hart	Cham	W	Wis	½Fl	10	60	Ros	36x5*	36x5†	Bim	.....	.....	164	....
Old Reliable C	4500	Wis UAU	4¼x6	28.9	...	C	Chic	PT	FS	Strm	V	Mon	Full	DD	Bos	....	Full	A	4	Spic	Shel	W	Shel	½Fl	8.7	42.5	Ros	34x5	36x5†	StM	.....	6650	168	75
Oneida D9	4345	Oneida	4½x5½	32.4	L	C	Own	C	F	Strm	V	Own	Own	DP	...	....	Own	A	4	Own	Math	W	Timk	Flot	10.33	49.6	....	40x8*	44x10	....	.....	7250	170	....
Orleans C	.....	Her MU 2	4¼x5½	28.9	L	C	Chic	PT	F	Mas	G	....	Det	DD	Eis	....	Cott	A	4	Bld	Mar	W	Wis	½Fl	10.33	.....	Ros	36x4½	36x8	Smi	Fir	6125	166	80
Paige 51-18	4285	Hin HA 200	4½x5½	32.4	L	C	Own	Fin	F	Strm	V	Sim	B-Li	DD	Bos	....	B-Li	A	4	Spic	Per	W	Timk	Flot	10 3	50.01	Ros	36x5	36x5†	Own	Fir	7000	160	85
Parker J20	4400	Wis VAU	4½x6	32.4	L	C	Own	PT	F	Strm	V	Pier	B-Li	DD	Bos	W	W-Gr	A	4	Bld	Tut	W	Own	Flot	8.75	43.6	Ros	38x7*	44x10*	Smi	.....	6550	160	76
Pierce Arrow W2	4950	Own	4½x6¾	32.4	T	C	.....	Fin	F	Strm	F	Own	.....	DD	Del	Opt	.....	A	4	.....	.....	W	.....	.....	8	49	....	36x5	36x5†	Pru	.....	8350	162	85
*Power C	.....	Hink HA	4¼x5½	32.4	L	G	GO	PT	F	Zen	V	Hin	Full	DD	Eis	W	Full	A	4	UM	Row	W	Wis	½Fl	10	.....	Ros	36x5	40x10	StM	.....	6420	160	78
Rainier R-15	4500	Cont L4	4½x5½	32.4	L	G	EM	PT	FS	Zen	V	Pier	B-Li	DP	Eis	....	B-Li	A	4	Spic	Per	W	Tim	.....	.....	.....	Ros	36x5	36x5†	....	Fir	....	170	70
Republic 20	3845	Cont E4	4½x5½	32.4	L	C	Own	Fin	FS	Strm	V	Phar	B-Li	DD	Bos	....	Full	A	4	Hart	Math	W	Torb	D	10.25	49.25	Jac	36x5	36x10	Smi	Fir	6360	165	....
Reynolds 7A	.....	Hink HA 1600	4¼x5½	32.4	H	C	Lng	Fin	F	Strm	G	Hin	Covt	DD	Bos	W	Covt	A	4	Shed	Per	W	Shel	....	8.7	44.36	Lav	36x5	36x5†	Smi	.....	....	176	80

Sandow M	4295	Cont E4	4½x5½	32.4	L	G	G	....	Fin	FS	Strm	G	Mon	....	DD	Bos	.....	B-Li	A	4	Spic	GC	W	Timk	.....	10	42	Ros	36x5	36x5†	Pru	.....	6500	175	70
Sanford W35	4200	Cont E4	4½x5½	32.4	L	G	G	.....	Fin	F	Strm	G	Pier	B.B.	DP	Eis	.....	B-Li	A	4	Spic	Per	W	Shel	.....	8.7	34.8	Ros	36x5	36x5†	Hoo	Fir	6750	174	75
Schacht	4350	Buda XTU	4¼x6	28.9	L	G	G	Own	PT	F	Sheb	G	Dup	Own	C	Bos	.....	Own	A	4	M&E	Nat	W	Own	Flot	.....	.....	Ros	36x5	36x5†	StM	.....	6500	168	70
Schacht	.....	Buda YTU	4¼x6	28.9	L	G	G	Own	PT	F	Sheb	G	Dup	Own	C	Bos	.....	Own	A	4	Spic	Per	W	Own	Flot	.....	42	.....	36x5	36x10	Stn	.....	7300	162	54.5

| | | |

Trade Name and Model	Chassis Price	ENGINE DETAILS: Make and Model Number 4 Cylinder unless otherwise noted	Bore and Stroke	N. A. C. C. Horsepower	Valve Arrange't	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	GEARSET: Make	Location	Speeds	Universal (Make)	Springs (Make)	REAR AXLE: Final Drive	Make	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	TIRES, WHEELS, RIMS: *Pneumatic †Dual Front	Rear	Wheels (Make)	Rim Equipment	Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels
5 Ton—Con'd		1			2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20			21			22	23			
Larrabee-Diego W	5100	Cont B2	4¾x6	36.1	L	C	Bus	Fin	F	Sheb	G	Sim	B-Li	DD	Bos	....	B-Li	A	4	Opt	Mer	W	Shel	½Fl	10	51	Ros	36x6	40x6†	Smi	....	9900	186	....
Mack AC5	5500	Own AC	5 x6	40	L	C	Own	Fin	S	Sheb	G	Own	Own	DP	Spl	....	Own	UJ	3	Spic	Mer	C	Own	D	9	28.89	Own	36x6	40x6†	Sch	....	8650	Op	68
Master B	5290	Buda ATU	4¾x6½	36.1	L	C	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	....	B-Li	A	4	Spic	Det	W	Timk	Flot	10	49.6	Ros	36x6	40x6†	Smi	....	8000	170	72
Master BL	5390	Buda ATU	4¾x6½	36.1	L	C	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	....	B-Li	A	4	Spic	Det	W	Timk	Flot	10	49.6	Ros	36x6	40x6†	Smi	....	8200	194	72
Master F	5440	Buda ATU	4¾x6½	36.1	L	C	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	....	B-Li	A	4	Spic	Det	R	Walk	Flot	11.5	55.6	Ros	36x6	40x6†	Wal	....	8000	170	72
Master FL	5540	Buda ATU	4¾x6½	36.1	L	C	Chic	PT	FS	Mas	V	Pier	B-Li	DP	Eis	....	B-Li	A	4	Spic	Det	R	Walk	Flot	11.5	55.6	Ros	36x6	40x6†	Wal	....	8200	194	72
*Menominee J	5450	Wis RAU	4¾x6	36.1	L	C	Own	Fin	FS	Strm	G	Mon	Det	DP	Eis	Opt	Cott	A	4	Spic	Tut	W	Timk	....	11.6	61.43	Ros	36x6	40x12†	Stn	Fir	8250	160	80
Moreland 21J	5350	Cont B2	4¾x6	36.1	L	C	Own	Fin	F	Mas	G	Con	Own	DD	Spl	....	Own	A	5	Ther	US	W	Timk	....	10.4	49.6	Ros	36x6	40x6†	Smi	....	9000	168	....
Nelson & LeMoon FC5	.....	Cont B2	4¾x6	36.1	L	C	Chic	PT	F	Strm	G	Pier	B-Li	DD	Bos	W	B-Li	A	4	Own	Tut	W	Timk	....	11.66	.....	Lav	36x6	40x6†	Pru	Gdy	8000	Op	80
Old Reliable D	5500	Wis RAU	4¾x6	36.1	..	C	Chic	PT	FS	Strm	V	Mon	W-Gr	WD	Bos	.....	B-Li	A	4	Spic	Shel	W	Shel	½Fl	10.25	41.5	Ros	36x5	40x6	StM	.....	8400	180	80
Oneida E9	5460	Oneida	4½x5½	32.4	H	C	Own	C	F	Strm	V	Own	Own	DP	Bos	.....	Own	A	4	Own	Math	W	Timk	Flot	11.66	70	....	36x6	40x12	.....	.....	9170	180	....
Packard EF	5550	Own	5 x5½	40	L	C	.....	Fin	F	Own	P	Own	Own	DP	Spl	Bj	Own	A	4	Spic	.....	W	Own	Flot	10.66	49	Ros	36x6	40x6	.....	.....	8400	156	57.2
Parker M20	5500	Wis RAU	4¾x6	36.1	L	C	Own	PT	F	Strm	V	Pier	B-Li	DD	Bos	W	W-Gr	A	4	Bld	Tut	W	Own	Flot	10.25	51.1	Ros	36x6	40x6†	Smi	.....	8400	160	78
Pierce Arrow R10	5700	Own	4½x6¾	32.4	T	C	.....	Fin	F	Strm	F	Own	.....	DD	Del	Opt	.....	A	4	.....	.....	W	.....	.....	10	61.2	.....	36x5	40x6†	Day	.....	9300	168	85
Rainier R-17	5250	Cont B-2	4½x5½	32.4	L	G	EM	Fin	F	Zen	V	Pier	B-Li	DP	.....	....	.....	A	4	.....	.....	W	.....	.....	.....	.....	Ros	36x6	36x36†	Smi	.....	8000	170	....
Reynolds 10A	.....	Hink HA1600	4½x5½	32.4	H	C	Lng	Fin	F	Strm	G	Hink	Covt	....	Bos	W	B-Li	A	4	Spi	.....	W	Timk	Flot	.....	.....	Lav	36x6	40x6†	Smi	.....	.....	176	80
Rowe FW5	5550	Wis VAU	4½x6	32.4	L	C	Fed	H	F	Zen	G	Sim	B-Li	DP	Bos	.....	B-Li	A	4	Sned	Per	W	Shel	....	10	51.9	Lav	36x6	40x6†	Smi	.....	8300	169	75
Sandow L	4975	Cont E4	4½x5½	32.4	L	G	.....	Fin	FS	Strm	....	Mon	.....	D	Bos	.....	B-Li	A	4	Spic	Shel	W	Shel	½Fl	8.7	40.7	Ros	36x6	40x6†	Hoo	.....	7800	175	70
Sanford W50	5100	Cont E4	4½x5½	32.4	L	G	McC	Fin	F	Strm	G	Pier	B.B.	DP	Eis	.....	B-Li	A	4	Spic	SP	W	Timk	Flot	12	46.6	Ros	36x6	40x6†	Stn	.....	8700	164	73
Schacht	5350	Buda YTU	4½x6	32.4	L	G	Own	PT	F	Sheb	G	Dup	Own	C	Bos	.....	Own	A	8	M-E	Nat	W	Own	Flot	10.75	52.03	Ros	36x5	40x6†	Hoo	Fir	8070	174	75
Schacht	5600	Cont B2	4¾x6	36.1	L	C	Lng	Fin	F	Strm	G	Con	Det	D	Eis	.....	B-Li	A	4	Spic	Shel	W	Own	Flot	10.25	55	Own	36x5	40x6†	StM	.....	8000	168	70
Selden 5A	5275	Buda YU	4½x6	32.4	L	C	.....	Fin	F	Strm	V	....	B.B.	DP	Eis	.....	.....	A	4	Spic	.....	W	Timk	....	10.25	49.6	Gem	36x6	40x6†	Stn	.....	9650	164	56½
Service 101	5300	Cont B2	4¾x6	36.1	L	C	McC	Fin	FS	Strm	G	Pier	B-Li	DD	Eis	.....	B-Li	A	4	Spic	Det	W	Timk	Flot	11.6	56.43	Ros	36x6	40x12	Smi	Gdy	8760	171	75
Signal R	5250	Cont B2	4¾x6	36.1	L	C	Lng	Fin	S	Strm	V	Mon	B-Li	DD	Eis	.....	B-Li	A	4	Spic	Per	W	Timk	Flot	11.66	66	Gem	36x6	40x12	Day	.....	9510	180	80
*Standard 5K	5500	Ster EU	5 x6¼	40	L	C	Own	C	F	Zen	V	Wau	H-S	DP	Eis	.....	Own	A	3	Spic	Math	W	Timk	Flot	8.8	39.79	Ros	36x6	40x6†	Pru	.....	8700	164	73
*Sterling 5-Worm	6000	Ster EU	5 x6¼	40	L	C	Own	C	F	Zen	V	Wau	H-S	DP	Eis	.....	Own	A	6	UM	Math	C	Own	D	7.04	42.5	Ros	36x6	40x6†	Smi	.....	9700	172	90
*Sterling 5-Chain	5300	Wis	4¾x6	36.1	L	C	Chic	Fin	F	Zen	G	Sim	Full	DD	Spl	.....	Full	A	4	Spic	Shel	W	Shel	½Fl	10.25	49.2	Ros	36x5	40x6†	Smi	.....	8500	164	62
Super Truck 100	5850	Cont B2	4¾x6	36.1	L	C	Own	Fin	F	Sheb	G	Con	B.B.	DP	Bos	W	Cott	A	4	Pet	Kal	W	Shel	....	10.25	53.3	Ros	36x6	40x6†	Smi	.....	8400	168	80
Tiffin	5400	Buda YTU	4½x6	32.4	L	C	B&W	ZZT	F	Strm	G	Sim	B.B	DP	Eis	.....	Cott	A	4	Pet	Shel	I	Cl	D	11	59	Lav	36x5	40x6†	Cla	.....	9100	156	70
Titan 6	5100	Buda YTU	4½x6	32.6	L	P	GO	Fin	F	Zen	G	Sim	B-Li	D	Bos	.....	B-Li	A	4	Spic	Mer	W	Shel	½Fl	10.2	.....	Ros	36x6	40x6†	Smi	.....	8400	170	75
*Traylor F	5250	Wis JA	5⅛x6	46.2	T	C	.....	H	FS	Strm	G	Pier	M-E	WD	KW	.....	Cott	A	3	Bld	.....	I	Own	½Fl	.....	.....	Ros	36x7	36x7	.....	.....	8000	140	60
Twin City 4-Wh. Drive DA	5250	Buda YTU	4½x6	32.4	L	C	Mod	....	F	Strm	G	Sim	Full	DD	Eis	Opt	Full	A	4	Bld	Bea	I	Cl	D	12.5	75.36	Ros	36x5	40x6†	Cla	.....	9150	160	70
United V 5	5100	Buda ATU	4¾x6½	36.1	..	C	Lng	Fin	F	Strm	V	Sim	B-Li	DD	Eis	Opt	B-Li	A	4	Opt	Shel	W	Shel	½Fl	10.25	54.8	Lav	36x6	40x6†	Smi	.....	9700	172	90
U. S., T	.....	Buda ATU	4¾x6½	36.1	..	C	Lng	Fin	F	Strm	V	Sim	B-Li	DP	Bos	W	W-Gr	A	4	M-E	Stan	I	Own	D	9	45	Ros	36x6	40x6†	Day	.....	8000	168	55
Walter 8	5600	Wau DU	4½x6¼	32.4	L	G	Bus	Fin	F	Strm	G	....	B-Li	DP	Bos	.....	B-Li	A	4	M-E	Mer	W	Timk	....	8.8	42.59	Ros	36x6	40x6†	Smi	.....	9300	190	85
Ward La France 5A	5590		5 x6¼	40	L	C	Own	Fin	F	Own	V	Own	Own	D	.....	.....	.....	U	4	Own	.....	R	Own	Flot	.....	.....	Own	36x6	40x6†	.....	.....	8200	174	....
*White 45	5000	Own	4¼x5¾	28.9	L	C	.....	Fin	F	Own	V	Own	Own	C	Bos	.....	Own	A	4	Spic	Shel	W	Wis	½Fl	10.25	56.58	Own	36.5	40x12	Smi	.....	9000	162	80
Wilcox F	.....	Buda	4¾x6½	36.1	L	C	.....	PT	S	Strm	V	Dup	Own	C	Bos	.....	Own	A	4	K-B	Per	W	Timk	....	10.25	49.6	Ros	36x6	36x6†	Smi	....	7500	160	80
Wilson H	5275	Own	4¾x6	36.1	L	G	Lng	PT	FS	Mar	V	Pier	B.B.	D	Eis	.....	Own	A	4	Bld	Math	I	Cl	D	12	60.5	Ros	36x5	40x6†	Cla	....	8300	162	80
Winther 109	5250	Wis VAU	4½x6	32.4	L	G	Brm	PT	F	Mas	V	Dup	B.B.	DP	Eis	W	B-Li	A	4	Bld	Math	I	Cl	D	12	60.5	Ros	36x6	40x7†	Cla	.....	9600	162	80
5½, 6 and 7 Ton																																		
*Available H7	6000	Her T3	5 x6	40	L	C	Chic	Fin	FS	Strm	V	Pier	B-Li	DD	Bos	.....	B-Li	A	4	M-E	Tut	R	Sav	½Fl	14	74.90	Ros	36x6	40x14	Smi	.....	10300	190	75
Bartlett 70	6500	Wis RBU	5 x6	40	L	C	Chic	PT	F	Strm	V	Sim	HS	.....	Bos	.....	Cott	...	3	Hart	Shel	C	Own	D	12.25	48	Ros	36x7	40x14	Smi	.....	11000	144	83
Bridgeport 6D	4500	Buda YTU	4½x6	32.4	L	G	Own	Fin	FS	Strm	..	Pier	B.B.	D	Eis	.....	Cott	A	4	Hart	Per	W	Eat	.....	13	42	Ros	36x6	36x12	Arc	....	12000	170	75
Couple Gear LD6	7450	Wis	5¾ x7	52.8	T	G	Idl	H	F	Strm	G	....	.....	.....	Eis	Own	Own	...	5	Own	Tut	B	Own	.....	12	.....	Own	36x5†	36x6	Own	Own	12000	144	55
Doane 6	6000	Wau PU	4¾x6¾	36.1	L	C	Own	PT	S	Mas	G	Wau	B-Li	DD	Bos	.....	B-Li	U	3	Own	Own	C	Own	D	10.5	42	Lav	36x6	40x6†	Wes	....	8500	178	79
Garford 150 A-7½	.....	Buda BTU	5 x6½	40	L	C	Own	Fin	F	Strm	G	Sim	.....	DD	Spl	.....	Own	UJ	4	Spic	Per	W	Timk	....	11.44	.....	Ros	36x6	40x7†	.....	.....	10000	162	....
Hall 7 Chain	5100	Cont E4	4½x5½	32.4	L	T	Own	PT	FS	Zen	G	Dup	B-Li	DP	Bos	.....	Own	A	..	Opt	Per	W	Timk	....	12	.....	Gem	36x5	40x6†	Smi	.....	8400	Op	....
Kelly-Springfield K60	5100	Own	4½x6½	32.4	T	C	Lng	Fin	F	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Own	Per	C	Own	D	12.39	45.19	Gem	36x6	40x7†	Smi	.....	8900	150	93
Maccar G	5100	Cont B2	4¾x6	36.1	L	C	Own	Fin	F	Zen	G	Con	B-Li	DD	Eis	.....	B-Li	A	4	Spic	Mer	W	Timk	Flot	10.2	54.83	Ros	36x5	40x6†	Day	Fir	9000	186	80
*MacDonald A	5500	Cont B2	4¾x6	36.1	L	C	Own	Fin	F	Zen	G	Con	B-Li	DD	Eis	.....	B-Li	U	4	Own	Own	I	Own	D	17.5	77	Own	40x7	Opt	Opt	.....	6000	...	66
Mack AC6½	5750	Buda YTU	4½x6	32.4	L	C	Own	PT	F	Strm	G	Sim	B-Li	DD	Spl	.....	Own	UJ	3	Spic	Mer	C	Own	D	10.50	33.70	Own	36x6	40x12	Sch	.....	8672	Op	73
Mack AC7½	5750	Own	5 x6	40	L	C	Own	Fin	S	Sheb	G	Own	Own	DP	Spl	.....	Own	UJ	3	Spic	Mer	C	Own	D	11.58	37.16	Own	36x7	40x7†	Sch	.....	9050	Op	73
Old Reliable K, L, M	6000	Own AC	5 x6	40	L	C	Own	Fin	S	Sheb	G	Own	Own	DP	Spl	.....	Own	UJ	3	Spic	Shel	C	Own	D	10.86	54.9	Ros	36x6	40x7†	Smi	.....	10240	136	78
*Sterling 7½-Chain	6250	Wau EU	5 x6¼	40	L	C	Chic	PT	FS	Strm	G	Wau	W-Gr	WD	Bos	.....	Own	A	4	Spic	Shel	C	Own	D	7.26	43.6	Ros	36x6	40x7†	Smi	.....	11000	174	91
Tiffin 6	6500	Ster EU	5 x6¼	40	L	C	Own	C	F	Zen	V	Wau	H-S	DP	Eis	.....	Own	A	6	UM	Math	C	Own	D	10.25	53.3	Ros	36x6	40x12	Smi	.....	9000	168	80
Union J	6050	Cont B2	4¾x6	36.1	L	C	Own	Fin	F	Sheb	G	Con	B.B.	DP	Bos	W	Cott	A	4	Pet	Kal	W	Shel	....	10.5	63	Ros	36x6	40x14	Smi	.....	9200	193	75
Union J.W	5450	Wis RBU	5 x6	40	L	G	GO	Fin	F	Sheb	G	Dup	Full	DD	Eis	LN	Full	A	4	UP	Math	I	Russ	.....	11.5	69.0	Ros	36x6	40x14	Smi	.....	9250	193	75
Wichita S	5800	Wis RBU	5 x6	40	L	G	GO	Fin	F	Sheb	G	Dup	Full	DD	Eis	LN	Full	A	4	UP	Math	R	Walk	....	11.5	69.0	Ros	36x6	40x14	Smi	.....	9250	193	75
Winther 140	5000	Beav JB	4½x6	32.4	H	G	Per	C	F	Strm	G	Dup	Own	C	Ber	.....	B-Li	A	4	Own	Det	R	Own	½Fl	14	66.3	Ros	36x6	40x6†	Smi	.....	9000	165	80
	5900	Wis-RBU	5 x6	40	L	G	Brm	PT	F	Mas	V	Dup	B.B.	DP	Eis	W	B-Li	A	4	Bld	Math	I	Cl	D	12	60.5	Ros	36x6	40x7†	Cla	.....	9600	162	80
Gasoline Tractor-Trucks																																		
Federal Light Duty	3200	Cont C4	4⅛x5¾	27.2	L	C	Own	Fin	FS	Zen	G	Phar	B.B.	DP	Eis	.....	Own	A	4	Spic	Math	W	Timk	Flot	9.2	40.7	Gem	36x4	36x7	.....	Fir	4700	120	....
Federal Heavy Duty	4150	Cont E4	4½x5½	32.4	L	C	Own	Fin	FS	Zen	G	Phar	B.B.	DP	Eis	.....	Own	A	4	Spic	Math	W	Timk	Flot	12	59.8	Gem	36x5	36x5†	.....	Fir	6800	114	....
Fulton D	.....	H Sp 7000	3½x5	19.6	L	T	GO	H	FS	Cart	G	.....	Covt	DP	Ber	.....	Covt	...	3	UP	.....	I	Russ	D	10.2	.....	Lav	36x4	36x6	Hoo	.....	3300	110	68
Hewitt-Ludlow 5-Ton	.....	Buda HTU	4¼x5½	28.9	..	..	Mod	Fin	..	Strm	..	....	.....	DP	Bos	.....	Own	..	..	.....	.....	.....	.....	.....	.....	.....	.....	36x4†	36x4†	.....	.....	5500	...	....
Koehler MT	3450	Her CU3	4 x5⅛	25.6	L	G	Own	PT	F	Zen	G	Sim	B-Li	D	Eis	.....	B-Li	A	4	Spic	Math	W	Timk	Flot	9.25	37	Lav	36x4	36x7	Way	.....	5000	129	75
Lombard 140H.P	.....	Spec 6	5½x6¾	72.7	...	C	Spec	H	F	Strm	P	....	.....	D	....	....	Spec	A	..	.....	.....	W	.....	.....	.....	.....	.....	Spe	.....	.....	.....	18000	...	90
Lombard 50 H.P	.....	Spec 4	5 x6¼	40	...	C	Spec	H	F	Strm	P	....	.....	D	....	....	Spic	A	..	.....	.....	W	.....	.....	.....	.....	.....	Spe	.....	.....	.....	8000	...	85
Mack AB 5-Ton	3400	Own AB	4 x5	25.6	L	C	Own	C	S	Sheb	G	Own	Own	DD	Spl	.....	Own	U	4	Spic	Mer	C	Own	D	10.5	42.27	Own	36x4	36x4†	Sch	.....	4940	120	....
Mack AC 7-Ton	4950	Own AC	5 x6	40	L	C	Own	Fin	S	Sheb	G	Own	Own	DP	Spl	.....	Own	UJ	3	Spic	Mer	C	Own	D	10.7	34.60	Own	36x5	40x5†	Sch	.....	7670	119	....
Mack AC 10-Ton	5500	Own AC	5 x6	40	L	C	Own	Fin	S	Sheb	G	Own	Own	DP	Spl	.....	Own	UJ	3	Spic	Mer	C	Own	D	11.5	37.16	Own	36x6	40x6†	Sch	.....	8250	119	....
Mack AC 13-Ton	5750	Own AC	5 x6	40	L	C	Own	Fin	S	Sheb	G	Own	Own	DP	Spl	.....	Own	UJ	3	Spic	Mer	C	Own	D	12.9	41.56	Own	36x6	40x12	Sch	.....	8272	119	....
Mack AC 15-Ton	6000	Own AC	5 x6	40	L	C	Own	Fin	S	Sheb	G	Own	Own	DP	Spl	.....	Own	UJ	3	Spic	Mer	C	Own	D	14.1	45.26	Own	36x7	40x7†	Sch	.....	8650	119	....
*Master T	3740	Buda HU	4¼x5½	28.9	L	C	Chic	PT	FS	Mas	V	McC	Full	DP	Eis	.....	Full	U	4	Spic	Det	R	Walk	Flot	8	32	Ros	34x4	36x7	Wal	.....	4500	110	76
Watson	4050	Cont E4	4½x5½	32.4	L	P	Jam	C	FS	Strm	G	Pier	B-Li	DP	Sim	.....	B-Li	U	4	Spic	Shel	W	Timk	Flot	8.75	42.35	Gem	34x4	36x5†	M&C	.....	6500	80	37

ELECTRIC COMMERCIAL CARS

E.C.M. Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels
Ward WS 2	750	1500	.....	13	Opt	45	G-E	Own	4	W	Shel	Shel	32x3	32x3	Own	88	60
C-T BR 1	1000	2000	2075	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3	W	89¼	60
*Walker M	1000	2300	.....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3½	Ross	94	66
Atlantic 1C	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
Ward WA	1250	2730	.....	12	Opt	45	G-E	G-E	4	W	Shel	Shel	32x3	34x3½	Own	90	60
C-T BR 2	2000	2400	2400	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3½	36x4	W	101	60
Lansden BG ¾	.....	1400	.....	15	Opt	50	G-E	G-E	4	R	Flot	.....	32x4½	32x4½	Lav	90	50
*Lansden MC 1	.....	2900	.....	12	Opt	50	G-E	G-E	4	C	Flot	.....	36x3	36x3½	.....	108	60
*Steinmetz	1000	3350	.....	16	Exide	55	Own	Own	4	B	Own	.....	33x4½	33x4½	Ross	Opt	60
Walker K	2000	2500	.....	14	Opt	60	West	West	5	O	Own	Math	34x3½	36x4	Ross	96	66
Ward WB	2000	3430	.....	10	Opt	40	G-E	G-E	4	W	Shel	Shel	34x3½	36x4	Own	102	60
Atlantic 2C	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x3†	Ross	115	65
C-T BR 4	4000	4000	2800	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4†	W	116	60
*Lansden MD 2	.....	4400	.....	11	Opt	50	G-E	G-E	4	C	Flot	.....	36x4	36x3†	.....	120	60
Walker L	4000	3700	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	66
Ward WD	4000	4500	.....	8.5	Opt	35	G-E	G-E	4	W	Shel	Shel	36x4	36x7	Own	114	60
Atlantic 3C	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5†	Ross	135	65
C-T AK 7	7000	5800	4200	11	Opt	50	G-E	Own	4	I	Dead	Shel	36x6	36x4†	W	122	55
*Lansden ME 3½	.....	5700	.....	10	Opt	45	G-E	G-E	4	C	Flot	.....	36x5	36x4†	.....	133	60
Ward WF	7000	6600	.....	7	Opt	30	G-E	G-E	5	W	Shel	Shel	36x5	36x8	Own	132	70
Atlantic 5C	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5†	Ross	144	65
*Couple Gear H	7000	9000	4750	10	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	55
*Couple Gear A	10000	10000	5250	7	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	75
C-T AK 10	10000	6500	4400	10	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5†	W	132	55
*Lansden MT 5	.....	7500	.....	10	Opt	40	G-E	G-E	4	C	Flot	.....	36x6	36x5†	.....	146	60
Lansden MG 6	.....	8900	.....	7	Opt	35	G-E	G-E	4	R	Flot	.....	36x7	36x6†	.....	156	60
Walker P	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	40x5†	Ross	131	66
Walker N	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	40x6†	Ross	141	66
Ward WH	10000	8375	.....	6	Opt	26	G-E	G-E	5	W	Shel	Shel	36x7	40x10	Own	144	70
Atlantic 6C	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	65
*Couple Gear LD	14000	11000	5900	10	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	55

Manufacturers and Models Included in Specifications on Preceding Pages

Acason—1, 1½, 2½, 3½, 5—Acason Motor Truck Co., Detroit, Mich.
Ace—1½, 2½—American Motor Truck Co., Newark, Ohio.
Acme—¾, 1, 1½, 2, 3½, 5—Acme Motor Truck Co., Cadillac, Mich.
Akron Multi-Truck—1—Thomart Motor Truck Co., Kent, Ohio.
American—2½, 4—American Motor Truck & Tractor Co., Portland, Conn.
Apex—1, 1½, 2½, 3½—Hamilton Motor Co., Grand Haven, Mich.
Armleder—1, 2½, 3½—O. Armleder Co., Cincinnati, Ohio.
Atco—1½, 2½—American Truck & Trailer Corp., Kankakee, Ill.
Atlantic—1, 2, 3, 5, 6—Atlantic Electric Vehicle Co., Newark, N. J.
Atlas—1—Atlas Truck Corp., York, Pa.
Atterbury—1½, 2½, 3½, 5—Atterbury Motor Car Co., Buffalo, N. Y.
Autocar—2, 3½, 5½—Autoocar Co., Ardmore, Pa.
Available—1½, 2, 2½, 3½, 5, 7—Available Truck Co., Chicago, Ill.
Avery—1—Avery Company, Peoria, Ill.
Bartlett—7—Bartlett Truck Co., Chicago, Ill.
Beck-Hawkeye—1, 1½, 2, 3—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.
Bell—1, 1½, 2½—Iowa Motor Truck Co., Ottumwa, Ia.
Belmont—1, 1½, 2, 3½—Belmont Motors Corp., Lewistown, Pa.
Bessemer—1, 1½, 2½, 4—Bessemer Motor Truck Co., Grove City, Pa.
Bethlehem—1, 2, 3, 4—Bethlehem Motor Truck Corp., Allentown, Pa.
Birch—1—Birch Motor Cars, Chicago, Ill.
Bridgeport—1½, 2½, 4, 6—Bridgeport Motor Truck Co., Bridgeport, Conn.
Brinton—2½—Brinton Motor Truck Co., Philadelphia, Pa.
Briscoe—1—Briscoe Motor Corp., Jackson, Mich.
Brockway—¾, 1½ 2½, 3½, 5—Brockway Motor Truck Co., Cortland, N. Y.
C. T.—1, 1½, 2, 3½, 5—Commercial Truck Co., Philadelphia, Pa.
Capitol—1½, 2½, 3½—Capitol Motors Corp., Fall River, Mass.
Case—2—J. I. Case Plow Works Co., Racine, Wis.
Chevrolet—¾, 1—Chevrolet Motor Co. of Mich., Flint, Mich.
Chicago—1½, 2½, 3½, 5—Chicago Motor Truck, Inc., Chicago, Ill.
Climber—1½—Climber Motor Corp., Little Rock, Ark.
Clydesdale—¾, 1, 1½, 2½, 3½, 5—Clydesdale Motor Truck Co., Clyde, Ohio.
Collier—1, 1½, 2, 2½—Collier Motor Truck Co., Bellevue, Ohio.
Columbia—1½, 2½—Columbia Motor Truck & Trailer Co., Pontiac, Mich.
Commerce—1¼, 1½, 2—Commerce Motor Car Co., Detroit, Mich.
Concord—1½, 2½—Abbott-Downing Truck & Body Co., Concord, N. H.
Corbitt—1, 1½, 2, 2½ 3½, 5—Corbitt Motor Truck Co., Henderson, N. C.
Couple Gear—3½, 6—Couple Gear Electric Truck Co., Grand Rapids, Mich.
Cyclone—1½—The Cyclone Motor Corp., Greenville, S. C.
Dart—1½, 2½, 3½—Dart Truck & Tractor Corp., Waterloo, Ia.
Day-Elder—1, 1½, 2, 2½, 3½, 5—Day-Elder Motors Corp., Newark, N. J.
Dearborn—1½, 2—Dearborn Truck Co., Chicago, Ill.
Defiance—1, 1½, 2—Defiance Motor Truck Co., Defiance, Ohio.
Denby—1, 1½, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.
Dependable—1, 1½, 2, 2½, 3½—Dependable Truck & Tractor Co., Galesburg, Ill.
Diamond T—1¼, 1½, 2, 3½, 5—Diamond T Motor Car Co., Chicago, Ill.
Diehl—1—Diehl Motor Truck Works, Philadelphia, Pa.
Doane—2½, 3½, 6—Doane Motor Truck Co., San Francisco, Cal.
Dodge—½—Dodge Bros., Detroit, Mich.
D-Olt—1½—D-Olt Motor Truck Co., Inc., Long Island City, N. Y.
Dorris—2, 3½—Dorris Motor Car Co. St. Louis, Mo.
Double Drive—4—Double Drive Truck Co., Chicago, Ill.
Douglas—1½, 2, 3—Douglas Motors Corp., Omaha, Neb.
Duplex—2, 3½—Duplex Truck Co., Lansing, Mich.
Duty—2—Duty Motor Co., Greenville, Ill.
Eagle—2—Eagle Motor Truck Corp., St. Louis, Mo.
Erie—2½—Erie Motor Truck Mfg Co., Erie, Pa.
F. W. D.—3—Four-Wheel Drive Auto Co., Clintonville, Wis.
Facto—2½—Facto Motor Trucks, Springfield, Mass.
Fageol—1½, 2½, 3½, 5—Fageol Motors Co., Oakland, Cal.
Fargo—2—Fargo Motor Truck Co., Chicago, Ill.
Federal—1, 1½, 2, 3½, 5, T.T.—Federal Motor Truck Co., Detroit, Mich.
Ford—1—Ford Motor Co., Highland Park, Mich.
Forschler—1, 1½, 2, 3—Forschler Motor Truck Mfg. Co., New Orleans, La.
Front Drive—1½—Double Drive Truck Co., Chicago, Ill.
Fulton—1, 2, T.T.—Fulton Motors Corp., Farmingdale, N. Y.
G. M. C.—¾, 1, 2, 3½, 5—General Motors Truck Co., Pontiac, Mich.
G. W. W.—1½—Wilson Truck Mfg. Co., Henderson, Ia.
Garford—¾, 1¼, 2, 3½ 5, 7½—Garford Motor Truck Co., Lima, O.
Gary—1½, 2½, 3½, 5—Gary Motor Truck Co., Gary, Ind.
Gersix—1½, 2½, 3—Gersix Mfg. Co., Seattle, Wash.
Giant—1½, 2½, 3½, 5—Giant Truck Corp., Chicago Heights, Ill.
Globe—¾—Globe Motors Co., Cleveland, Ohio.
Gove—2½—Gove Motor Car Co., Detroit, Mich.
Graham—1½—Graham Brothers, Evansville, Ind.
Gramm-Bernstein—1, 1½, 2, 2½, 3½, 5—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
Hahn—1, 1½, 2, 2½, 3½, 5—Hahn Motor Truck & Wagon Co., Hamburg, Pa.
Hal-Fur—2, 3½—Hal-Fur Motor Truck Co., Cleveland, Ohio.
Hall—2½, 3½, 5, 7—Lewis-Hall Motors Corp., Detroit, Mich.
Harvey—1½, 2½, 3½, 5—Harvey Motor Truck Co., Harvey, Ill.
Hawkeye—1½, 2, 3½—Hawkeye Truck Co., Sioux City, Ia.
Hendrickson—2½, 3½, 5—Hendrickson Motor Truck Co., Chicago, Ill.
Hewitt-Ludlow—1½, 2, 2½, 3½, 5, T.T.—Hewitt-Ludlow Auto Co., Inc., San Francisco, Cal.
Highway-Knight—4, 5—Highway Truck Corp., Chicago, Ill.
Higrade—1, 1½—Higrade Motors Co., Harbor Springs, Mich.
Holmes—2—Holmes Motors Mfg. Co., Littleton, Colo.
H. R. L.—¾, 1½, 2½—H. R. L. Motor Co., Seattle, Wash.
Huffman—1½—Huffman Bros. Co., Elkhart, Ind.
Hurlburt—1½, 2½, 3½, 5—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.
Huron—1½, 2½—Huron Truck Co., Bad Axe, Mich.
Independent—1½, 2½, 3½—Independent Motor Co., Youngstown, Ohio.
Independent—1½, 2½—Independent Motor Truck Co., Inc., Davenport, Ia.
Indiana—1¼, 2, 2½, 3½, 5—Indiana Truck Corp., Marion, Ind.
International—1, 1½, 2, 3, 5—International Harvester Co., Chicago, Ill.
Italia—2, 3, 5—Italia Motor Truck Co., San Francisco, Cal.
Jackson—3½—Jackson Motors Corp., Jackson, Mich.
J & J—2—The Lorain Motor Truck Co., Lorain, Ohio.
Jumbo—1½, 2, 2½, 3, 3½, 4—Nelson Motor Truck Co., Saginaw, Mich.
Kalamazoo—1½, 2½, 3½—Kalamazoo Motor Corp., Kalamazoo, Mich.
Kankakee—2½—Kankakee Automobile Co., Kankakee, Ill.
Karavan—2½—Caravan Motors Co., Portland, Ore.
Kearns—¾, 1½—Kearns-Dughie Motors Co., Danville, Pa.
Kelly-Springfield—1½, 2½, 3½, 5, 6—Hare's Motors, Inc., New York, N. Y.
Keystone—2—Keystone Motor Truck Corp., Philadelphia, Pa.
Kimball—2, 2½, 3, 4, 5—Kimball Motor Truck Co., Los Angeles, Cal.
King Zeitler—2, 4—King Zeitler Co., Chicago, Ill.
Kissel—1, 1½, 2½, 4, 5—Kissel Motor Car Co., Hartford, Wis.
Kleiber—1, 1½, 2, 2½, 3½, 5—Kleiber & Co., Inc., San Francisco, Cal.
Koehler—1½, 2½, 3½, T.T.—H. J. Koehler Motors Corp., Bloomfield, N. J.
Lange—2—Lange Motor Truck Co., Pittsburgh, Pa.
Lansden—¾, 1, 2, 3½, 5, 6—Lansden Company, Danbury, Conn.

Larrabee-Deyo—1½, 2½, 3½, 5—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
L. M. C.—2½—Lousiana Motor Car Co., Shreveport, La.
Lombard—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.
Lone Star—1—Lone Star Truck & Tractor Assn., San Antonio, Tex.
Luedinghaus—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
Luverne—2, 3,—Luverne Automobile Co., Luverne, Minn.
Maccar—1½, 2½, 3½, 6—Maccar Truck Co., Scranton, Pa.
MacDonald—7—MacDonald Truck & Tractor Co., San Francisco, Cal.
Mack—1½, 2, 3½, 5, 6½, 7½, T.T.—International Motor Co., New York, N. Y.
Master—1½, 2½, 3½, 5, T.T.—Master Trucks, Inc., Chicago, Ill.
Maxwell—1½—Maxwell Motor Co., Inc., Detroit, Mich.
Menominee—1, 1½, 2, 3½, 5—Menominee Motor Truck Co., Menominee, Mich.
Moline—1½—Moline Plow Co., Moline, Ill.
Moreland—1, 1½, 2½, 4, 5—Moreland Motor Truck Co., Los Angeles, Cal.
Mutual—2, 2½—Mutual Truck Co., Sullivan, Ind.
Napoleon—¾, 1, 1½—Napoleon Motors Co., Traverse City, Mich.
Nash—1, 2—Nash Motors Co., Kenosha, Wis.
Nelson-LeMoon—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.
Netco—2, 2½—New England Truck Co., Fitchburg, Mass.
Niles—2—Niles Motor Truck Co., Pittsburgh, Pa.
Noble—1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.
Northway—2, 3½—Northway Motors Co., Natick, Mass.
Norwalk—1, 1½—Norwalk Motor Car Co., Martinburg, W. Va.
O. K.—1½, 2½, 3½—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
Ogden—1½, 2½—Ogden Motor Truck Co., Chicago, Ill.
Old Hickory—1—Kentucky Wagon Mfg. Co., Louisville, Ky.
Old Reliable—1½, 2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.
Oldsmobile—1—Olds Motor Works, Lansing, Mich.
Olympic—2½—Olympic Motor Truck Co., Tacoma, Wash.
Oneida—1¼, 1½, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.
Orleans—1½, 2½, 3½—New Orleans Motor Truck Mfg. Co., New Orleans, La.
Oshkosh—2—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
Packard—2, 3, 5—Packard Motor Car Co., Detroit, Mich.
Paige—1½, 2½, 3½—Paige-Detroit Motor Car Co., Detroit, Mich.
Parker—2, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.
Patriot—1, 2, 3—Patriot Motors Co., Lincoln, Neb.
Penn—2—Penn Motor Corp., Philadelphia, Pa.
Pierce-Arrow—2, 3½, 5—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Pioneer—1—Pioneer Truck Co., Chicago, Ill.
Pittsburger—2½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
Power—1½, 3½—Power Truck & Tractor Co., Detroit, Mich.
Premocar—1½—Preston Motors Corp., Birmingham, Ala.
Rainier—¾, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., Flushing, L. I., N. Y.
Ranger—2—Southern Motor Mfg. Ass'n, Ltd., Houston, Tex.
Reliance—1½, 2—Reliance Motor Truck Co., Appleton, Wis.
Reo—1—Reo Motor Car Co., Lansing, Mich.
Republic—1, 1½, 2½, 3½—Republic Motor Truck Co., Inc., Alma, Mich.
Reynolds—1½, 2½, 3½, 5—Reynolds Motor Truck Co., Mt. Clemens, Mich.
Riker—3, 4—Locomobile Co. of America, Bridgeport, Conn.
Rowe—1½, 2, 3, 4, 5—Rowe Motor Mfg. Co., Lancaster, Pa.
Rumely—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.
Samson—¾, 1¼—Samson Tractor Co., Janesville, Wis.
Sandow—1, 1½, 2, 2½, 3½, 5—Sandow Motor Truck Co., Chicago, Ill.
Sanford—2½, 3½, 5—Sanford Motor Truck Co., Syracuse, N. Y.
Schacht—2, 2½, 3½, 5—G. A. Schacht Motor Truck Co., Cincinnati, Ohio.
Schwartz—1, 1½, 2½, 4—Schwartz Motor Truck Co., Reading, Pa.
Selden—1½, 2½, 3½, 5—Selden Truck Corp., Rochester, N. Y.
Seneca—½—Seneca Motor Car Co., Fostoria, Ohio.
Service—¾, 1, 1½, 2½, 3½, 5—Service Motor Truck Co., Wabash, Ind.
Signal—1, 1½, 2½, 3½, 5—Signal Motor Truck Co., Detroit, Mich.
Southern—1, 1½, 2—Southern Truck & Car Corp., Greenboro, N. C.
Standard—1, 2½, 3½, 5—Standard Motor Truck Co., Detroit, Mich.
Steinmetz—¾—Steinmetz Electric Motor Car Corp., Baltimore, Md.
Sterling—1½, 2, 2½, 3½, 5, 7½—Sterling Motor Truck Co., Milwaukee, Wis.
Stewart—¾, 1, 1½, 2, 2½, 3½—Stewart Motor Corp., Buffalo, N. Y.
Stoughton—1, 1½, 2, 2½—Stoughton Wagon Co., Stoughton, Wis.
Success—2½—Webberville Truck Co., Webberville, Mich.
Super Truck—2½, 3½, 5—O'Connell Motor Truck Co., Waukegan, Ill.
Superior—1, 2—Superior Motor Truck Co., Atlanta, Ga.
Tiffin—1½, 2½, 3½, 5, 6—Tiffin Wagon Co., Tiffin, Ohio.
Titan—2½, 3½, 5—Titan Truck Co., Milwaukee, Wis.
Tower—1½, 2½, 3½—Tower Motor Truck Co., Greenville, Mich.
Trabold—2½—The Trabold Company, Johnstown, Pa.
Traffic—2—Traffic Motor Truck Corp., St. Louis, Mo.
Transport—1, 1½, 2½, 3½—Transport Truck Co., Mt. Pleasant, Mich.
Traylor—1½, 2, 3, 4, 5—Traylor Eng. & Mfg. Co., Cornwells, Pa.
Triangle—¾, 1½, 2, 2½—Triangle Motor Truck Co., St. Johns, Mich.
Triumph—1½, 2—Triumph Truck & Tractor Co., Kansas City, Mo.
Twin City—F. W. D., 3½, 5—Twin City Four-Wheel Drive Co., Inc., St. Paul, Minn.
Twin City—2, 3½—Minneapolis Steel & Mach. Co., Minneapolis, Minn.
Ultimate—1½, 2, 2½, 3—Vreeland Motor Co., Inc., Newark, N. J.
Union—2½, 4, 6—Union Motor Truck Co., Bay City, Mich.
United—1½, 2½, 3½, 5—United Motors Co., Grand Rapids, Mich.
Ursus—1, 1½, 2½—Ursus Motor Co., Inc., Chicago, Ill.
U. S.—1½, 3, 4, 5—United States Motor Truck Co., Cincinnati, Ohio.
Velie—1½—Velie Motors Corp., Moline, Ill.
Vim—½, 1, 2, 3—Vim Motor Truck Co., Philadelphia, Pa.
Walker—½, 1, 2, 3½, 5—Walker Vehicle Co., Chicago, Ill.
Walker-Johnson—2½—Walker-Johnson Truck Co., Woburn, Mass.
Walter—5—Walter Motor Truck Co., New York, N. Y.
Ward—¼, 1, 2, 3½, 5—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
Ward La France—2½, 3½, 5—Ward La France Truck Co., Inc., Elmira, N. Y.
Watson—¾, 3½, T.T.—Watson Wagon Co., Canastota, N. Y.
White—¾, 2, 3½, 5—White Co., Cleveland, Ohio.
White Hickory—1, 1½, 2½—White Hickory Motor Corp., Atlanta, Ga.
Wichita—1, 1½, 2, 2½, 3, 3½, 5½—Wichita Falls Motors Co., Wichita Falls, Tex.
Wilcox—1, 1½, 2½, 3½, 5—H. E. Wilcox Motor Co., Minneapolis, Minn.
Wilson—1½, 2½, 3½, 5—J. C. Wilson Co., Detroit, Mich.
Winther—1, 1½, 2, 2½, 3½, 5, 6—Winther Motor Truck Co., Kenosha, Wis.
Witt-Will—1½, 2—Witt-Will Co., Inc., Washington, D. C.
Wolverine—1, 1½, 2, 2½, 3½—American Commercial Car Co., Detroit, Mich.
Yale—1½—Yale Motor Truck Co., New Haven Conn.
Yellow Cab—¾, 1—Yellow Cab Mfg. Co., Chicago, Ill.
Young—1, 2, 3½—The Young Motor Truck Co., Euclid, Ohio.

Activities of the Motor Truck Association of Philadelphia

OFFICERS

W. Y. ANTHONY, President
CHARLES J. SWAIN, Vice President
W. H. METCALF, Sec'y, 328 N. Broad Street
W. R. WALTON, Treasurer

BOARD OF GOVERNORS

T. K. QUIRK **J. D. HOWLEY** **F. P. GAUL**
F. A. KISSEL **H. A. NEILL**

THE COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

THE May meeting of the Motor Truck Association, of Philadelphia, last of the season prior to their outing on June 15, was held May 15, at the Hotel Adelphia.

The members of the association were particularly well pleased with the report of Thomas Quirk, chairman of the Legislative Committee, telling of their successful campaign with the State Legislature in securing a big reduction in the proposed increases for motor truck license fees, the bill being passed by the Legislature and signed by the Governor.

W. H. Metcalf, secretary, called the attention of the association to proposed police regulations of traffic that Lt. Schultz was to have explained to the association, but who was unable to be present. Mr. Metcalf said that he understood the police department, under the new State law, giving cities the right to formulate traffic regulations, was considering the exclusion of motor trucks from Broad Street, and diverting truck traffic to 13th and 15th Streets, making those thoroughfares one-way streets. He said he felt that the motor truck interests, through the Traffic Committee, could secure reasonable regulations by conferring with the police authorities prior to July 1, when it is proposed to put new rules into effect.

A. R. Miller, who was particularly active in the license fee fight before the Legislature, called their attention to the hundreds of thousands of dollars which would revert to this county by reason of his protest on the 1-cent-a-gallon gasoline tax, of which the Legislature agreed to allow one-half to revert to the county in which the tax originated. Mr. Miller suggested that the Truck Association and other organizations get busy to see that some of this money is used for the maintenance of city streets, the improvement of traffic signals and in nummerous other ways to benefit all kinds of vehicular traffic.

SERVICE IS A NEW INDUSTRY

Dealer and Manufacturer Should Realize That Service is Not an Obligation, But a Commercial Industry

By RALPH C. ROGNON

THE development of Motor Transportation has been rapid beyond belief, and so crowded with the work of producing, improving and selling of complete vehicles that an all-important factor in the making of a completely successful industry has been overlooked or neglected.

That all-important factor is—**The Maintenance of Continuous Transportation Efficiency for the Full Life of a Motor Vehicle**—a vital need and demand of the owner and just as vital to the maintenance of the manufacturers' reputation.

During the mushroom growth of this industry there has been a concentrated effort toward **manufacturing** and **selling**. The financial incentive which these two branches of the industry naturally created made that field of endeavor the most attractive. This is one of the reasons why the Service Departments have not been developed and operated on a **competitive commercial** basis. If such were the case, the larger dealer and factory branches in large cities would have developed their service organizations in such proportion that they would be able to repair their own cars cheaper and better than anyone else, instead of servicing less than 50 per cent of the cars in their local territory.

Realizing that these conditions exist in our industry, some of the other industries, such as the American Express Co., General Baking Co., and others, who have had their own problems to solve, have been called upon to solve this service problem themselves, because of its vital importance in completing their business transactions. Cannot we, as an industry, develop our Service Departments to such a degree that through enough volume of business to warrant production methods we can surpass not only in price but also in quality of workmanship, the service the fleet owner is called upon to render to himself, handicapped as he is by his lack of knowledge and equipment?

We have simply a business issue to face—we must **advertise and sell** a product before we produce it. We must reduce overhead expense through a steady volume of business and efficient equipment,—**through an efficient production department,** through training of personnel, and more important than anything else, through the development of plans for our men to follow in production. The manufacturer would not designate five men to build a truck without any plans, yet, mechanics in our Service Departments are called upon to "fix it."

Our Service Departments have operated as an adjunct to the sales department for so long, their chief motive being to adjust complaints caused by the improper functioning of a new car, that it will take several years of concentrated efforts collectively as an industry to solve the perplexing problems that confront this new program of **selling service,** that will maintain continuous transportation efficiency for the full life of trucks.

Classification of Service is Essential

Policies of certain companies have differed slightly, but we all have the same story to tell the public and the sooner we decide just what that story is, and just how we will tell it, the better chance we will have toward educating the public as to what he should demand from a service organization.

In discussing service we have dealt more in generalities than in details. The manufacturer has regarded service as essential to the reputation of his product, but at the same time he is more interested in the profit derived from the sales of service parts than in a solution of service as a whole rendered to the owner. The dealer has been in closer touch with service on the "firing line," but at the same time his sincere interest has been to maintain a service department that would **help** sell his product.

We have two kinds of service, namely, "Warranty Service" and "Maintenance Service." Under the head of Warranty Service we are called upon to adjust the complaints of the improper functioning of the new car, and while with some companies this class of work consumes the chief duties of the service manager, in reality it should be handled by a specially trained man, backed up by an efficient production department, and should be a small cog in the wheel of our maintenance program.

Our Maintenance Service is divided in four main heads—namely—Selling Service, Accounting Department, Parts, Material and Accessory Department and a Production Department. Our Production Department has three classes of service to produce. These are—Maintenance, General Repairs and Complete Rebuilding. Under the head of Maintenance we must conduct a maintenance depot, principally for lubrication of cars. Consistent keeping of records of repair jobs coming into the shop show that well over 60 per cent of these repairs could have been eliminated through proper lubrication and adjustments. These maintenance depots should be equipped with efficient equipment, with compressed air as a big factor. In ten minutes a car can be thoroughly lubricated, using an air gun with a mixture of kerosene and oil and forcing this lubricant between body and chassis, fenders, brake and clutch shaft joints and between spring leaves, thereby eliminating all squeaks and rattles. Changing of lubricant in transmission, differential and motors is an important factor in maintenance that is entirely up to a Service Department, especially in view of the fact that it has been repeatedly proven that the owner will not perform these operations.

Under the head of General Repairs are the necessary repairs due to mechanical defects caused by wear, abuse or accidents. Internal adjustments also come under the head of General Repairs, and this class of work is essential as an adjunct to proper maintenance, the taking up of bearings, grinding valves, removing carbon, adjusting gears to proper mesh, adjusting wheel bearings, etc., etc., are representative operations in the making of internal adjustments, and if taken care of at the proper mileage interval will add materially to the life of the vehicle.

In complete rebuilding we have an undeveloped industry,—the rebuilding of a truck takes into account nothing less than the making of complete repairs. In order to secure best results from rebuilding trucks must be completely disassembled, each individual unit completely rebuilt and tested. The truck must then be built up from these rebuilt units by productive methods similar to those employed by the manufacturer.

The sooner large central service organizations are opened and maintained that will service the full needs of the owner, the sooner the confidence of the public will be gained, but these organizations must have the hearty co-operation of the industry and be recognized as a part of the industry, whether they are official dealers' organizations, several dealers combined together to procure volume, or whether they are independent and not connected with any sales organization, should make little difference, as long as they are delivering the goods.

Local automotive service associations can be a big help in this development program. In the first place association meetings afford the opportunity for the service executives to become acquainted with one another and discuss their executive problems on the theory that nobody knows as much as everybody knows, and the fellow that shuts his door on his own secrets will shut out a whole lot more than he will shut in.

Price List of Truck Pneumatic Tire Casings, With Capacities and Inflation Pressures of Larger Sizes

	30 3½	32 4	34 4	32 4½	34 4½	33 5	34 5	35 5	36 x 6			38 x 7			40 x 6			42 x 9			44 x 10		
									Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure
Ajax Rubber Co., Inc., New York, N. Y.																							
Ajax Cord, non-skid	26.20	44.05	46.60	49.80	52.25	61.95	.....	65.15	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
American Rubber & Tire Co., Akron, O.																							
Americord, non-skid	24.50	43.90	46.40	49.70	52.10	61.80	.....	65.00	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Bergougnan Rubber Corp., Trenton, N. J.																							
Bergougnan Cord, non-skid	28.50	51.75	55.75	59.50	62.50	72.50	.....	75.75	119.70	2000	90	161.10	2700	100	202.50	4000	110	.....	....	...	.....	....	...
Braender Rubber & Tire Co., Rutherford, N. J.																							
Bull-Dog Super Cord, non-skid	25.85	43.45	45.90	49.10	51.55	61.15	.....	64.25	110.40	2200	90	156.15	3000	100	201.15	4000	110	.....	....	...	.....	....	...
Brunswick-Balke-Collender Co., Chicago, Ill.																							
Brunswick Cord, non-skid	24.50	44.00	46.50	49.75	52.15	61.85	63.50	65.00	92.75	2200	90	131.15	3000	100	169.00	4000	110	228.00	5000	120	.....	....	...
Empire Tire & Rubber Co., Trenton, N. J.																							
Empire Cord, non-skid	26.15	43.95	46.45	49.65	52.15	61.85	.....	65.00	100.20	2000	90	141.75	2700	100	182.65	3650	110	.....	....	...	.....	....	...
Erie Tire & Rubber Co., Sandusky, O.																							
Erie, non-skid	33.75	52.90	55.80	60.95	63.95	75.00	.....	77.65	120.00	2200	120	169.80	3000	130	218.75	4000	140	.....	....	...	.....	....	...
Falls Rubber Co., Cuyahoga Falls, O.																							
Falls Cord, Neverslip Cord	31.15	52.30	55.30	59.15	62.05	73.65	75.50	77.35	123.00	2200	90	163.00	3000	100	225.00	4000	110	.....	....	...	.....	....	...
Federal Rubber Co. of Ill., Cudahy, Wis.																							
Federal Cord, non-skid	.....	58.75	61.95	66.20	69.75	82.75	.....	.....	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Federal H. D. Cord Cross Bar Rugged	.....	.....	.....	.....	.....	.....	.....	87.50	121.05	2300	100	171.05	3000	110	220.40	4000	120	.....	....	...	.....	....	...
Firestone Tire & Rubber Co., Akron, O.																							
Firestone Cord, non-skid	24.50	46.30	48.95	52.35	54.90	65.20	.....	68.45	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Fisk Rubber Co., Chicopee Falls, Mass.																							
Fisk Cord, non-skid	27.50	46.30	48.95	52.35	54.90	65.20	66.80	68.45	110.50	2200	90	156.50	3000	100	201.50	4000	110	.....	....	...	.....	....	...
General Tire & Rubber Co., Akron, O.																							
General Cord, non-skid	27.50	49.90	51.90	57.30	60.15	71.15	81.60	72.60	117.75	2200	90	162.95	3000	100	209.85	4000	110	298.65	5000	120	417.45	6000	130
Gillette Rubber Co., Eau Claire, Wis.																							
Gillette Safety Tread Cords	24.90	41.85	44.25	47.30	49.65	58.90	.....	61.90	88.30	2200	90	124.95	3000	100	160.95	4000	110	.....	....	...	.....	....	...
Goodrich, B. F., Rubber Co., Akron, O.																							
Goodrich Cord	.....	.....	.....	.....	.....	.....	81.35	.....	119.35	2200	90	168.80	3000	100	217.45	4000	110	.....	....	...	.....	....	...
Goodyear Tire & Rubber Co., Akron, O.																							
Goodyear Cord, All Weather	.....	46.30	48.95	52.35	54.90	65.20	.....	68.45	119.35	2200	100	168.80	3000	110	217.45	4000	120	272.35	5000	130	380.65	6000	140
Gordon Tire & Rubber Co., Canton, O.																							
Gordon, non-skid, Triangle Cord	28.40	52.90	55.10	62.90	68.30	77.30	.....	81.20	126.00	2100	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Hewitt Rubber Co., Buffalo, N. Y.																							
Hewitt Cord, non-skid	24.50	46.30	48.95	52.35	54.90	65.20	.....	68.45	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Howe Rubber Corp., Inc., New Brunswick, N. J.																							
Howe Ultra Cord, non-skid	.....	47.05	49.80	53.25	55.85	66.30	.....	69.70	107.40	2000	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
India Tire & Rubber Co., Akron, O.																							
India Cord, non-skid	27.85	46.80	49.50	52.90	55.50	65.90	67.60	69.25	109.45	2200	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Kelly-Springfield Tire Co., New York, N. Y.																							
Kelly-Springfield Cord, B. B.	.....	46.00	49.40	53.00	55.40	65.40	66.60	68.00	106.40	2000	90	155.40	3000	100	198.55	4000	110	.....	....	...	.....	....	...
Lee Tire & Rubber Co., New York, N. Y.																							
Lee P. P., non-skid	29.10	40.50	43.35	.....	54.05	.....	.....	61.95	106.00	1970	90	143.20	3000	100	180.00	4000	110	.....	....	...	.....	....	...
Long Wear Tire & Rubber Co., Anderson, Ind.																							
Long Wear, non-skid	.....	55.00	56.10	60.50	64.10	.....	.....	79.55	.....	....	...	150.00	2720	100	193.10	3595	110	.....	....	...	.....	....	...
McCreary Tire & Rubber Co., Indiana, Pa.																							
McCreary Cord, non-skid	.....	52.10	56.20	68.25	73.80	78.75	.....	85.45	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
McGraw Tire & Rubber Co., Cleveland, O.																							
McGraw Cord, non-skid	24.90	41.85	44.25	47.30	49.65	58.90	.....	61.90	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Madison Tire & Rubber Co., New York, N. Y.																							
Madison Cord, non-skid	30.00	49.10	51.90	55.50	58.20	69.10	.....	72.55	88.30	2000	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Marathon Tire & Rubber Co., Cuyahoga Falls, O.																							
Marathon Cord, Angle	26.50	41.85	44.25	47.30	49.65	58.90	.....	61.90	117.00	2000	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Mason Tire & Rubber Co., Kent, O.																							
Mason Cord, non-skid	.....	.....	.....	.....	.....	.....	72.85	.....	95.50	2200	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Meyer Rubber Co., Columbiana, O.																							
Meyer Cord, ribbed	20.00	33.65	36.10	45.00	47.95	.....	.....	58.80	102.05	2200	90	144.30	3000	100	185.90	4000	110	.....	....	...	.....	....	...
Michelin Tire Co., Milltown, N. J.																							
Michelin Cord	24.50	46.00	48.50	52.00	54.50	65.00	.....	68.00	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Miller-Anderson Rubber Works, Anderson, Ind.																							
Double-Anchored Cord	23.44	41.85	44.25	47.30	49.65	58.90	.....	61.90	95.00	2000	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Miller Rubber Co., Akron, O.																							
Miller Cord, "Geared-to-the-Road"	24.75	45.80	48.35	51.80	54.20	64.50	66.65	67.75	119.92	2200	90	131.76	3000	100	174.16	4000	110	196.08	5000	120	274.80	6000	130
Mohawk Rubber Co., Akron, O.																							
Mohawk Cord, non-skid	32.00	51.50	53.50	58.20	60.00	72.50	.....	75.00	119.35	2200	100	168.85	3000	110	217.50	4000	120	272.25	5000	130	380.75	6000	140
Monarch Rubber Co., Hartville, O.																							
Monarch Cord, non-skid	34.25	52.30	55.30	59.15	62.05	73.65	.....	77.35	120.00	2200	90	170.00	3000	100	215.00	4000	110	.....	....	...	.....	....	...
Nebraska Tire & Rubber Co., Omaha, Neb.																							
Cornhusker	20.00	33.65	36.10	45.00	47.95	.....	.....	58.80	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Norwalk Tire & Rubber Co., Norwalk, Conn.																							
Norwalk Cord, non-skid	23.50	44.05	46.55	49.80	52.25	62.00	.....	65.15	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Odell Rubber Co., South Bend, Ind.																							
Odell Cord, non-skid	24.90	36.25	39.15	46.10	48.75	60.00	.....	.....	88.15	2000	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Oldfield Tire Co., Akron, O.																							
Oldfield Cord, anti-skid	25.75	47.45	50.20	53.65	56.05	66.25	.....	.....	.....	....	...	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Pennsylvania Rubber Co., [illegible]																							

| | | |

Does the Average Truck Owner Know *WHY* He is Not Getting Tire Mileage?

Here's the Kind of Service the Dealer Can Give on Pneumatic Truck Tires

The Owner Will Appreciate It, and the Expense to the Dealer Will be Small

BOTH the rapidly broadening adaptability and the steadily increasing use of the motor truck as a common carrier of freight, both as an auxiliary to and in many cases as an actual competitor of the railroad freight transportation system of America, make it increasingly apparent that motor truck tire equipment must be such as will meet any demand instantly, withstand rigorous tests, cope with unfavorable road conditions, and stand up under the strain of heavy pay-loads.

Unquestionably the development and perfection of the pneumatic truck tire has materially broadened the scope of usefulness of the motor truck. In fact, the advent of the perfected pneumatic truck tire ushered in a new era of truckportation for the world at large.

The success of the motor truck for rural and urban use, and as a means of transporting goods between cities, naturally depends predominantly upon the tire equipment, and the degree of service that may be expected from such truck tire equipment, in turn, depends upon the care exercised in driving over bad stretches of road, in procuring proper alignment of wheels, and in proper inflation and mounting of the giant pneumatic tires.

Scientific study of road conditions has resulted in a highly perfected pneumatic tire for automobiles. In fact, such scientific study has more than trebled the mileage service of the pneumatic automobile tire within the past ten years. Thus with the pneumatic truck tire a comparatively new factor in the field of truckportation, the same scientific study, and the same careful application of the results of such scientific research work, are requisite to increase the usefulness of the pneumatic truck tire.

But not until the motor truck owners awaken to a full appreciation of the pneumatically equipped truck as a direct competitor of the railroad in many instances, and as an auxiliary to railroad freight service under other conditions, will the pneumatic truck tire be shown the respect it deserves, and be taken care of in a proper manner so as to guarantee maximum usage.

Tire builders have spent years of painstaking research work and millions of dollars in perfecting the pneumatic tire for both automobiles and motor trucks, in determining the exact method of compounding rubber with various ingredients so as to vulcanize a tough, resilient tire of great durability. Tire manufacturers have also made exhaustive road studies and have built tires calculated to overcome all varied road conditions and to render satisfactory service under practically all conditions.

Render Educational Service

The tire builder can do no more. He has done his part and has given the motor truck owner the best pneumatic tire that it is possible for human ingenuity to manufacture. The rest is up to the truck owner and the driver. Whether he gets satisfactory and maximum service out of his pneumatic truck tires, depends solely upon himself without even discounting road conditions.

Maximum service is naturally the aim of the manufacturer in turning out pneumatic tires, and is also the paramount desire of the truck owner. But economy of travel and tire usage, goes hand and hand with this factor and is of equal importance to the truck owner.

In this connection the by-word of tire manufacturers "Keep your tires properly inflated if you want to lower tire costs" is a warning that cannot be too often emphasized or driven home for owners of motor trucks, for proper inflation is the key to maximum service of the truck tire. Proper inflation means economy not alone in tire equipment but in truck operation. It means more mileage out of the truck owner's tire equipment. It means more rapid transportation. It means easier overcoming of road obstacles. And it means more miles per gallon of gasoline.

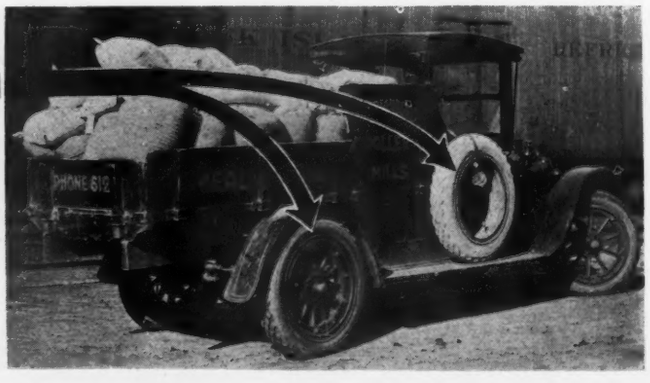
Proper traction is an important factor in truckportation, and underlying this is the fundamental of proper inflation. In turn proper traction means fuel economy on long runs and every operating cost that can be cut down means just that much more profit in delivery by motor truck.

Therefore proper service of the pneumatic truck tire hinges fundamentally upon proper inflation.

When the pneumatic tires on a motor truck are working under-inflated the tires are breaking down abnormally fast, and naturally will have to be replaced sooner than should be necessary.

When driving a motor truck on under-inflated tires, this briefly is what happens:

TIRES REQUIRE ATTENTION AND *SERVICE* JUST AS MUCH AS THE POWER UNITS



1. The weight of the load pushes in the tread where it comes in contact with the road, flattens it out and so brings a greater surface in contact with the road. This increases wear on the tread.

2. Where an under-inflated tire strikes a stone or a bump it gives extensively. This results in a break in the inner fabric threads which spread quickly. It may also result in bringing the tire up against the rim sharply, so that the tread is caught between the rim and the stone and is cut.

3. Under-inflation means that the tread is bent into a sharp angle with the side-wall. This constant excessive bending and flexing not only cracks the fabric, but generates heat to such an extent that the rubber in the plies weakens and is unable to hold together. Finally the tube is pinched and a blow-out results.

4. Excessive deflection of the tire causes tread separation, because the tire is flattened and the tread rubbers conflict. The resultant working of rubber between the carcass and the tread rubber produces tread separation.

5. Clincher tires when under-inflated will be subject to rim cuts. Overloading of truck will produce the above results also, in varying degrees, according to whether the tires are under-inflated or fully inflated.

Tire manufacturers have drafted a scale showing the proper loads and inflation pressures for pneumatic cord truck tires as follows:

Tire Section Diameter

Inflation Pressure Lb.	4½ in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.
80	1350	1570					
90		1660	2000				
100				2700			
110					3650		
120						4650	
130							5800

Metal and Rubber Markets

Ultimate Consumer Must Save Steel Situation

The steel industry is accepting the present situation with resignation which represents a means between the two extremes of optimism and pessimism.

A diagnosis of the situation reveals that it is beyond control of any group of individuals. The events eventually will so shape themselves as to bring about a return to normal prosperity.

The present depressed conditions cannot be laid to the steel industry, or, in fact, to any one industry or group of industries.

It must be conceded that the source of either depression or elation is the ultimate consumer. Upon his ability or inclination to spend money will depend the activity of the steel market.

At the moment there is so little doing in steel that there is no longer anything to say which can be taken as a matter of news or which is not already well understood.

Automobile, truck and machinery manufacturers, structural fabricators and other consumers coming in close contact with the mills report a recent falling off in business.

Steel Products Prices

Per ton—Pittsburgh—	
Bessemer billets	$37 00 a 39 00
Open hearth	37 00 a 39 00
Forging billets	42 00 a .....
Sheet bars	39 00 a .....
Slabs	38 00 a .....

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—	
Pittsburgh (base)	$3 00 a $3 10
Philadelphia	3 10a 3 90
New York	3 38 a 3 48
Galvanized Sheets of Black Sheet Gauge—	
Pittsburgh	5 00 a .....
New York	5 38 a .....

Finished Iron and Steel

Tank plates, Pittsburgh	$2 20 a .....
Tank plates, New York	2 58 a .....
Steel bars, New York	2 48 a .....
Steel bars, Pittsburgh	2 10 a .....

Iron and Steel at Pittsburgh

Bessemer iron	$25 96 a .....
Bessemer steel, f.o.b. Pittsb'h	37 00 a .....
Ferromanganese (80%)	80 00 a 85 00
Steel, melting scrap	13 50 a 14 50

OTHER METAL PRODUCTS.—Following are current prices for brass and bronze products:

Copper sheets, not rolled	$20 50 a 20 75
Copper bottoms	28 00 a 28 25
Seamless tubing, bronze	22 50 a .....
Seamless tubing, copper	22 00 a .....
Copper rods	19 25 a 20 00
Low brass sheets	17 75 a .....
Brazed tubing, brass	27 50 a .....
Brazed tubing, bronze	32 25 a .....
Brazed tubing, copper	32 25 a .....
Seamless high brass tubing	20 00 a .....
Seamless low brass tubing	21 50 a .....
Sheet zinc, f.o.b. smelter	10 00 a .....

ANTIMONY.—There is little demand for antimony, and no feature beyond routine light trading at current prices.

MANGANESE.—There is no improvement in demand for manganese and chrome, and the market for both is easy without attracting buyers who are well supplied.

OLD METALS.—Demand for aluminum and copper scrap has improved and prices have advanced in consequence.

Aluminum—	Buying.	Selling.
Cast scrap	8⅜a 8⅞	9½a10
Sheet scrap	8⅜a 8⅞	9½a10
Clippings	12⅜a13⅝	15½a16½
Copper—		
Heavy machinery comp.	8¾a 9¼	10 a10½
Heavy and wire	8¼a 8½	9½a 9¾
Light and bottoms	7¼a 7¾	8½a 8¾
Heavy, cut and crucible	9¼a 9½	10½a11
Brass, heavy	4½a 4¾	5¼a 5½
Brass, casting	5¼a 5¾	6½a 6¾
Brass, light	3¼a 3¾	4½a 4¾
No. 1 clean brass turn's	4¼a 4½	5 a 5¼
No. 1 comp. turnings	6¼a 6½	7½a 7¾
Tea lead	2¼a 2½	2⅞a 3⅛
Lead, heavy	3½a 3¾	4 a 4¼
Zinc scrap	2 a 2½	3 a 3¼
Solder joints	5 a 5½	6 a 6¼
New zinc clippings	3½a 4	4 a 4½
Pewter dishes	16 a18	20 a22
Block tin, scrap	25 a27	29 a30

Rubber Depression Deep; Prices Make New Low Records While Consumption Declines

Para—Up river, fine	a 16½
Up-river, coarse	9¼a ..
Island, fine	a 18
Island, coarse	9 a ..
Cameta	9 a ..
Plantation—	
Centrals—Corinto	7½a ..
Esmeralda	7½a ..
Mexican scrap	6 a ..
Guayule, wet	15 a 18
Guayule, dry	25 a ..
Balata, block, Trinidad	53 a ..
Balata, block, Colombian	38 a 39
Balata, Panama	36 a 37
Balata, sheet	65 a 68

SCRAP RUBBER.—There is practically no market for anything in this line at present.

Tires—Automobile	1 a ..
Inner tubes, No. 1	.. a 8
Inner tubes, No. 2	.. a 5

N. A. C. C. Secures Freight Reclassification

The traffic department of the National Automobile Chamber of Commerce has been instrumental in securing a reclassification of motor trucks and chassis when shipped in carload lots to points west of Chicago and the Mississippi River.

The clause, which read "Automobiles, freight, set up, loose or in packages, carloads, first class," will be changed to read "Second class." The item which now covers "Chassis, loose or in packages in carloads, first class," will also be changed to "Second class." The saving on freight charges on a 15,000-lb. load of trucks amounts to $35.25 on shipments to Kansas City or Omaha; $68.25 to Dallas, Galveston and Houston; $88.50 to Denver; other points in proportion.

Ver Linden Leaves Olds

Edward Ver Linden has resigned from the Olds Motor Works, where he has been acting in the capacity of general manager and president. He is to direct the Sheridan Motor Car Plant, which has recently been acquired by Durant Motors from the General Motors Corp. A. B. C. Hardy succeeds him as president of the Olds Co.

Ace Reduced

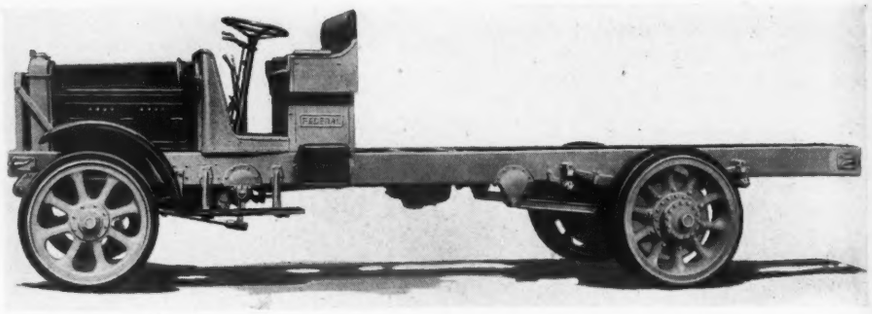
The American Motor Truck Co., Newark, Ohio, has announced reductions in its various Ace models. They are as follows: $455 or 16½ per cent on the 1½-ton; $655 or 23½ per cent on the 2½-ton; thus making the 1½-ton $2295 and the 2½-ton $2795.

NEW COMMERCIAL CARS

Federal Announces New Heavy-Duty Job

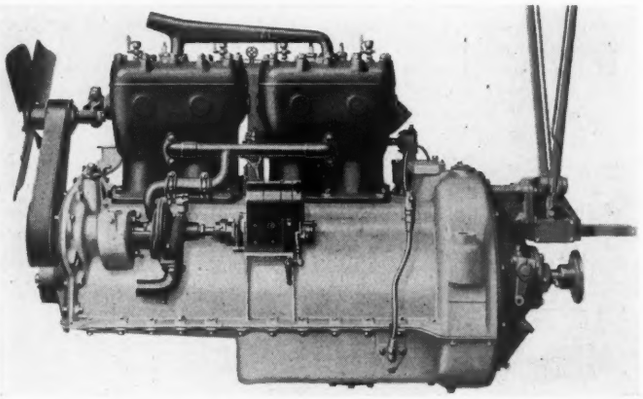
THE new Model X-2, 5- to 6-ton Federal, lately announced by the Federal Motor Truck Co., Detroit, Mich., although retaining practically all of the features of the former Model XE, has been redesigned throughout. In addition to a few changes in units, this model is especially characterized by its oversize assembly. Most conspicuous of the new improvements is the employment of a power plant that is said to be 25 per cent more powerful than that used before. In the redesigning of this model the engineers tried to keep one objective to the fore, and that was the truck's adaptation to the demands of heavier haulage conditions. Many refinements have also been added.

Many illuminating points are brought out by even roughly comparing the new model with the old. Comparison discloses that the newcomer has a larger engine, resulting in a displacement of 425 cu. in. over that of 350 cu. in., the displacement of the former model. It has a removable cylinder head instead of a head integral with the cylinders, larger bearings throughout, a full force feed oiling system instead of circulating splash, electrical equipment instead of oil lights and hand horn, and provision for electric starter. Ignition remains the same. A 14-in. clutch supersedes the 12-in.; larger diameter propeller shaft, heavier frame, stronger transmission with a reduced reduction in the rear axle and increased reduction in the transmission, which is said to attain greater speeds in high gear without sacrifice of power in the lower gears, constitute some more of the changes toward oversize construction. Further comparisons show that the new truck is also better equipped, being fitted with vacuum feed instead of gravity, a hubodometer and four towing hooks.



Recently Announced Federal Five to Six-Ton Model
It has a heavier duty gearset with reduced reduction in the rear axle, which allows greater speeds on high gear

The engine, which is of the first production of a new Continental model, has been designed for severe service. It is a four-cylinder 4¾ x 5-in. engine, capable of developing 50 hp. at 1100 r.p.m. The S. A. E. rating is 36.1 hp.



Left-Hand Side of the New Continental Engine Used in the New Federal Job
Note the rounded effect of the engine blocks, which is indicative of ample water jacketing. Magneto, water pump and fan are driven from the same shaft. Provision is made for the ready installation of a self-starter on either side of the engine. Head is removable.

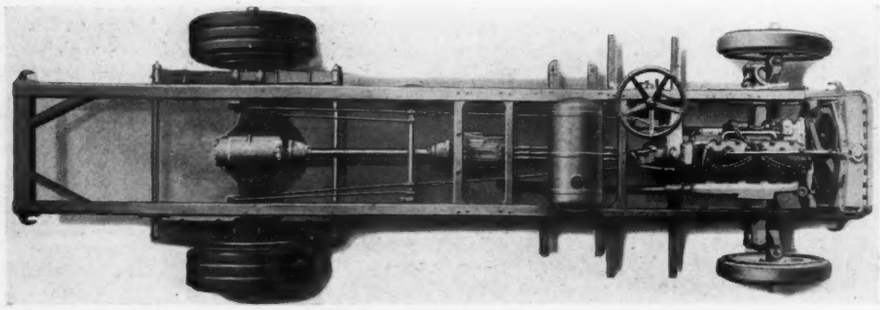
The cylinders are cast in pairs, with removable heads.

The end thrust of the three-bearing crankshaft is taken on the front bearings, to allow for unequal expansion between the shaft and the crankshaft, and also provides an adjustment for end play. Four rings are used in each piston.

The gear train at the front of the engine consists of four gears instead of the conventional three. The use of the idler gear between the cam and pump gears makes it possible to distribute the location of the accessories, such as the pump, generator, magneto, etc., so that they may be accessibly installed. The camshaft also operates on three bearings. The diameter of the camshaft at the bearings is greater than in the height of the cams, permitting the removal of the shaft without disturbing the bearings. The valves are on the right side of the engine and are 2 1-32 in. diam. They are completely enclosed by removable plates.

Cooling is provided for by a centrifugal water pump, mounted on the water pump and magneto shaft, which is driven off the same gear that supplies the drive to the fan, on right side of engine.

Lubrication is provided by a full pressure feed system, which includes a pump driven by spiral gears from the camshaft. Oil is led to the timing gears and main bearings through leads. The connecting rod bearings are lubricated by oil led to them through the drilled crankshaft, and the wrist pin bearings are supplied from oil ducts. An oil pressure adjusting valve is built into the engine and a pressure gage is located on the dash. A non-clogging type of strainer is provided and is carried in the oil pan. The oil



Plan Showing the Disposition of Units
The new model is particularly distinguished from the former heavy-duty model by the new Continental engine, the transmission and rear axle

sump is cast in the oil pan in the lower part of the engine. This construction makes the draining of old or dirty oil an easy operation.

The gasoline feed system comprises a pressed steel tank of welded construction. It rests in a malleable iron saddle, held by straps. Gasoline is fed from this to the engine by a Stewart vacuum system.

An Eisemann high tension Model G-4 magneto provides ignition. It is mounted on a bracket cast integrally with the crankcase and is driven by the pump shaft. An impulse starter is provided as stock equipment.

The engine is suspended from three points. The front end of the engine is supported by a circular trunnion, cast integrally with the timing gearcase, and resting in a saddle, which is bolted to a cross-member.

The governor is a Pharo, a centrifugal device, with an oil inertia medium. The action raises and lowers a piston, which opens and closes a butterfly valve in the intake pipe.

From the engine the power is transmitted to a Borg & Beck clutch of the single dry plate type, similar to the clutch used on all Federal models, to a four-speed gearset. This transmission provides the following gear ratios: High, 1 to 1; third speed, 1.75 to 1; second speed, 3.22 to 1; first speed, 5.85 to 1, and reverse, 6.8 to 1. The gearset is mounted amidships and suspended from three points. A power-take-off for coupling up a hoist or winch or any other mechanical auxiliary is provided by the removal of plates on either side of the case.

The truck is made in chassis lengths, with a wheelbase of 163 in. on two of them and 187 in. on the third. The first two have a loading space of 130 in. and 154 in. respectively. The 187-in. wheelbase provides a loading space of 190 in. The overall length of the frame in all three types is the same, 222 in. Steering is through a Gemmer worm and worm gear type of steering gear. Control levers for the spark and throttle are mounted on the steering column. Drive is left.

Electrical equipment consists of an electrical generator, 6-volt battery, two electric side lamps, with diffusing lenses, and electric tail lamp. A feature of the equipment is the mounting of the tail lamp in a recess in the rear of the frame and of the license plate on the rear frame, in such a way that it is illuminated by the white light of the tail lamp.

The axles are Timken type, mounted on Timken roller bearings throughout. On the front axle the rear eyes of the front spring are slightly lower than the front eyes, thus providing a caster effect. The rear axle is the Timken, full-floating worm type, with a ratio of 10¼ to 1 as standard. The standard tire equipment comprises 36 x 6-in. front, and 40 x 6-in. dual rear; 40 x 12 in. giant pneumatics can be provided if desired.

The wheels are steel, with hollow cast spokes, but webbed internally for strength. Among the features of standard equipment are towing or pintle hooks, securely fastened at the front of the frame; a hubodometer, attached to the left front wheel hub, and all-bearing surfaces throughout are provided with Alemite greasing attachments.

Stewart Offers New Speed Truck

THE Stewart Motor Corp., Buffalo, N. Y., announces a new 1-ton speed truck. This new model is stated to easily negotiate 22 deg. grades with capacity load, show an average of 14 to 16 miles per gal. gasoline, and develop a speed in excess of 40 m.p.h. with capacity load. The turning radius is short and all the mechanical units contain the latest known engineering improvements.

The new Stewart is distinguished particularly by its new power plant. The engine used is the new Buda Model MU. This engine has been designed particularly for speed truck work, and has a bore and stroke of 3⅝ in. x 5⅛ in., respectively. It is of the removable head type. The feature of accessibility has been considered in that the cylinder block is also removable. This engine is rated at 21.03 S. A. E. horsepower.

Ignition is through an Eisemann high-tension magneto, and carburetion is accomplished by a new model Zenith carburetor, which is adjustable with hot-spot, quick-starting device. Gasoline is fed to the carburetor by gravity from a 16 gal. round type tank which is made of terne-coated steel and supported on malleable iron brackets under the seat.

Lubrication is through full-force pressure feed to crankshaft, camshaft bearings and connecting-rod bearings. Chassis lubrication is effectively secured through the Alemite system.

Water is circulated by a centrifugal pump having a large bronze runner. The radiator is of the cast-iron armored type with vertical tubes, and has a capacity of five gallons.

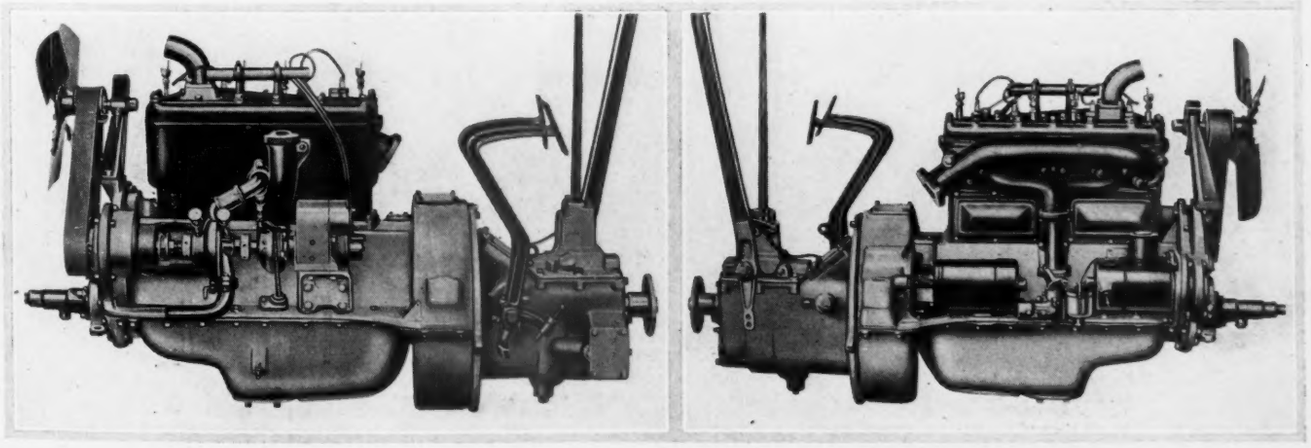
The clutch is of the dry-plate, multiple-disk type, with one set of steel plates, and another set of steel disks lined with moulded clutch facings. The engine, clutch and transmission are mounted as one unit, on three-point suspension. Shafts of the transmission are mounted on annular ball bearings.

The rear axle is a Clark internal-gear drive, the same as used on other Stewart models. It is geared 6.75 to 1 so the total reductions from engine to rear wheel are as follows: High, 6.75 to 1; intermediate, 11.48 to 1; low, 27 to 1; reverse, 30.38 to 1.

The front axle is of the drop-forge type 1¾ in. wide by 2⅜ in. deep, made from high-grade carbon steel, heat treated.

The steering gear is of the screw-and-nut type with an adjustment on the thrust bearings for removing any end motion of the screw that may develop.

The frame side rails are 4½ in. deep and 2¼ in. wide, and the thickness of the



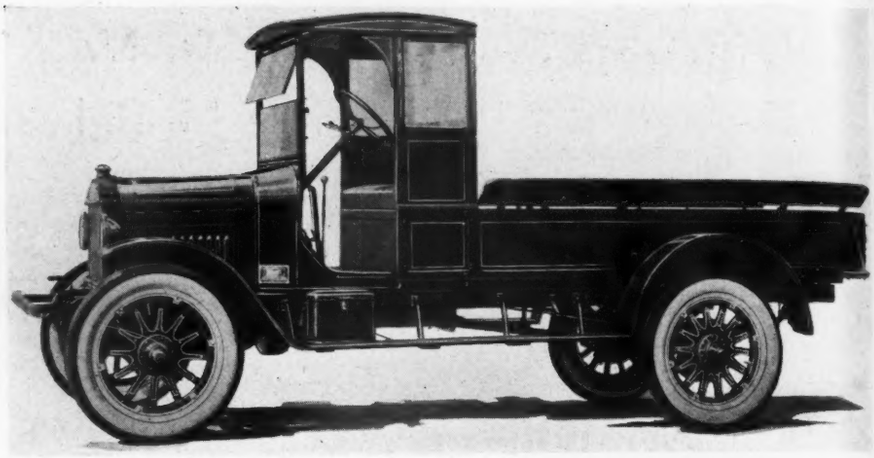
Left and Right Views of the New Buda Model MU Used in the New Stewart Speed Job

steel used is 3/16 of an in. There are three cross members, two of which are hot riveted solidly in place.

The front and rear springs are semi-elliptic in type, 41 in. by 2 in. wide, 54 in. by 2 in. wide, respectively. They are equipped with full-length rebound plate. These springs are made of special grade silico manganese alloy steel, heat treated for flexibility and long life. Bronze bushings working on hardened steel pins are used throughout. Spring lubrication is by Alemite high-pressure lubricating system.

The wheel are the artillery type, 12 spokes front and 14 in the rear. The spokes are square.

The truck is equipped with 35 x 5 cord tires all around. The regular equipment consists of electric head lights, with legal lenses, equipped with dimming device, electric tail lamp, tool box, 111-hour Willard Storage Battery, tools, jack, horn, oil gage, and armature. Chassis painted red, black fenders and running-board.



Showing the New Speed Job Recently Introduced by the Stewart Motor Corporation

The price of this chassis, complete with the above equipment, is $1875, plus war tax, f. o. b. Buffalo. This 1-ton Stewart truck will take an open or covered express body, panel, stake or special farmer's grain-type body. Starter, $50.00 extra.

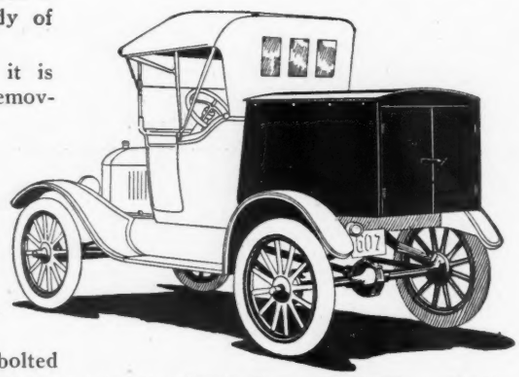
The New Martin-Parry Steel Slip-on Body for Ford Roadster

The Martin-Parry Corp., York, Pa., and Indianapolis, Ind., recently introduced a new and improved steel panel body of the slip-on type.

This body is designed so that it is easily mounted on the chassis by removing the regular rear deck of a Ford roadster, and fastened in place by special bolts.

The main frame is constructed of selected hardwood reinforced at joints with special irons. Access to the storage battery is given through a removable section in the floor. The sides, front end, top and double rear doors are made of sheet steel panels, bolted to hardwood frames. A special fastener is provided on the rear door.

This new body is designed for knocked-down shipment. It is crated flat, the floor, side panels, front end panel, top and rear doors forming the various parts. The fact that this job is built on jigs to close measurements gives foundation to the claim that it goes together and bolts up firmly, quickly, and without any trouble.

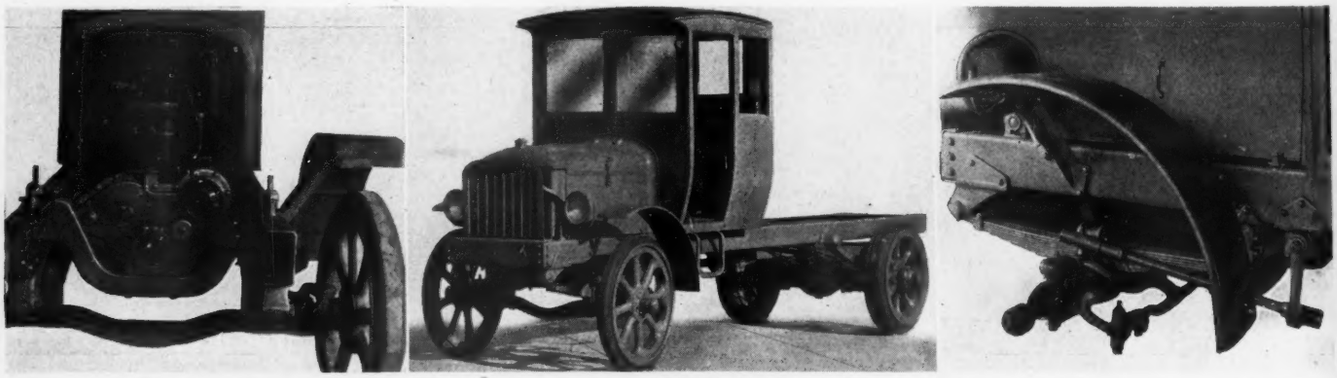


No. 171 Martin-Parry Steel Slip-on Body for Ford Roadster

Dimensions are: Length, 40 in.; width, 32 in.; length of side panels, 24 in. The finish is a weatherable glossy black enamel.

Another product very much similar to the above job in the Martin-Parry line is an open style express slip-on body for the Ford roaster. This body, built of hardwood, and sturdily reinforced with iron bracing, has 5-in. flare boards and a drop end-gate. It is 58 in. long, 34 in. wide and the side panels are 10 in. deep.

According to the Department of Agriculture of Kansas, there are great possibilities for the manufacture of gasoline from wheat straw. It has been estimated that one ton of wheat straw will produce the equivalent of 40 gallons of gasoline.



Showing a Three-Quarter View of the Two and a Half Ton Facto Truck and Two Close-ups of the Front Wheel Assembly and the Engine Mounting

The center illustration shows the truck furnished with weather-proof cab, headlight and radiator guard as standard equipment. The left-hand illustration brings out the features of accessibility. The engine is made readily accessible by removing the front cross-member of the frame. This view also shows the ball-and-socket radiator supports. Note the heavy and well-designed front engine support. The engine is hung low, it is stated, to give low center of gravity and a straight-line drive. The right-hand illustration shows the drag link, in line with the front spring eye, which is said to make for easy steering. Another feature is the simplicity of mud-guard construction which permits of easy and inexpensive replacement. This truck, manufactured by the Facto Motor Trucks, Inc., Springfield, Mass., is essentially an assembled proposition consisting of such units as the model ETU Buda engine, Model G-7 Fuller four-speed transmission, Timken axle, Ross steering gear, Pierce governor, Zenith carburetor, etc. The price, f. o. b. Springfield, including Prest-O-Lite tank, headlights and cab, $2,895. This truck is built for local distribution.

Garford Line to Contain New Three-Quarter Ton Model

THE already extensive line of the Garford Motor Truck Co., Lima, Ohio, has again been augmented by the addition of a new ¾ ton model. It is known as Model 15, and, the manufacturer points out, it contains the general characteristics and embodies the features of the heavier types of the line. This newcomer has a normal road speed of from 25 to 30 m.p.h. Early and speedy production is expected in view of the added facilities of the recently completed progressive assembly plant at the Garford factories.

Bodies for this chassis are also being produced. The most important of which are: The flare board express with standing top (removable type), curtains and built-in windshield, and the full panel type with built-in windshield.

The list prices, f.o.b. Lima, announced on the model are: $1590 for standard chassis equipped with seat; $1780, with express body, and $1815, with panel body.

The engine used in this model is a four-cylinder, 3⅝ in. x 5⅛ in., detachable head, L-head type construction, suspended from three points. It has an S. A. E. rating of 21 hp. The crankcase consists of two sections, both of which are of gray iron. Three main bearings support the crankshaft. The valves are large and are fully enclosed on the right side.

A combination full-force-feed and splash is employed in the lubricating system. Oil is fed under pressure to the connecting-rod bearings and cylinders through a drilled crankshaft. Wrist pin bearings are lubricated by splash. The camshaft bearings are lubricated under pressure and the valve mechanism is also lubricated by the oiling system.

Water for cooling is circulated by a centrifugal pump through large water passages and a tubular type radiator. The core and tanks of this radiator are built up in unit and securely assembled to a pressed steel radiator shell. Full protection is afforded the radiator against shock and vibration by rubber cushions interposed between the radiator base and cross-member. Cooling is further facilitated by an 18-in. four-blade steel fan, to which operating power is transmitted through a wide flat belt.

A battery system of ignition is used. Carburetion is accomplished by a carburetor of the float feed type, located on the right side of the engine. Gasoline is fed from a tank located on the dash by gravity. The tank is of special shape and construction, having lapped heads and locked seams. It is made of terne plate and is coated on the inside. The capacity is 12 gal. The carburetor is also featured by a large sediment trap mounted on the dash-shutoff valve.

From the engine the power is carried through a single dry-disk clutch, enclosed in the flywheel housing. Accessibility for inspection and adjustment is made possible through a covered hand hole. The clutch is in unit with the transmission and engine. Three speeds are provided by the selective sliding gear transmission. The gears and shafts of this unit are of nickel steel.

From the transmission a three-point construction of drive is employed, in which short shafts are used between the gearset and mid bearing and from the mid bearing to the rear axle. The shafts are linked up by universal joints, of all-metal construction, grease tight and dust-proof. A long slip sleeve is provided on the rear joint.

Final drive is through a worm and worm gear. The hardened steel worm of this axle meshes with a bronze gear. The differential is bevel type. Road thrust is taken up by the wheel bearings. The differential is supported in a differential carrier, which also supports the bearings of the worm shaft and makes a unit of the worm, worm gear and differential, and contains all the bearings and adjustments necessary for these parts. The rear axle housing is of pressed steel and special truck design.

Two sets of brakes are provided, service and emergency. They are two complete sets of internal expanding type, operating independently on the rear wheels. Both sets are equalized.

The controls are as follows: Foot accelerator, spark and throttle levers on steering post, brake and gear-shift levers in the center, and brake and clutch pedal at the left. The lighting switch and panel board is mounted on the dash in convenient reach to the driver.

The frame is of channel section, hot riveted, pressed steel, reinforced by gusset plates and cross-members. It is mounted on four semi-elliptic springs. The front measure 40 x 2¼ in.; rear, 50 x 2¼ in. They are of alloy steel.

The front axle is a conventional "I" beam section, drop-forged in one piece. The knuckles are Elliot type and the bearings plain thrust.

Cord pneumatics, 34 x 5-in. front and 35 x 5 in. rear, are used. The wheels are of heavy construction and are of the artillery type.

The 132-in. wheelbase of this truck provides a loading space of 96 in. from the back of the seat. Length from dash to center of rear axle is 104 in. and from rear of seat to center of rear axle, 61 in. The tread in front and rear is 56 in.

Two special units included as regular equipment are a speedometer and a power air-pump. The speedometer is mounted on a panel and is driven direct from the transmission. The air pump, which is a single cylinder, air-cooled, high pressure type, is specially provided to insure clean air, free from oil. The pump is bolted to the left side of the gearset and is equipped with 15 ft. of air hose, having a special thumb lock valve connection.

The standard equipment consists of the following: Dash, two electric head lamps, one electric rear signal lamp, one electric dash lamp, jack, complete set of tools, mechanical horn, oil can, and complete electric lighting and starting system, using a standard 6-volt, 90-amp. battery.

Many New Features Have Been Incorporated in the New Three-Quarter-Ton Garford Job

Statistical Information to Help Industries

Representatives of trade associations are in full accord with the desire of the Administration to obviate price-fixing through the dissemination of trade figures. This attitude was expressed before Secretary of Commerce Hoover.

Mr. Hoover conferred with representatives of the automobile industry on the question of obtaining from them trade data for publication by the department. Secretary Hoover stressed the point that the Department was not prying in to the individual business of the various industrial units, but rather to make possible a comprehensive viewpoint on the country's important industry, with blanket figures, to assist in stabilizing their business.

Heil Quadruple Combination Dump Body

The Heil Co., Milwaukee, manufacturers of steel dump bodies, Hydro hoists and compartment truck tanks, recently designed a new type of combination body.

The value of a combination body has long been recognized, for it makes possible a body having coal capacity, one having gravel or sand capacity, a platform body for boxes, crates and the like, and a long platform body for lumber, pipe, beams, etc. These bodies can be supplied for any make of truck, ranging in capacity from 2 to 11 or 12 tons capacity. This particular combination body, however, is designed for trucks of 5 tons or more in capacity.

In the new design the front and rear ends of the body are detachable and are bolted in place. The sides are bolted on with three bolts. When these bolts are removed the upper section can be lifted off, leaving a body with gravel capacity, with the front and rear just high enough to give satisfactory service. The driver is able to look back out of the cab window and see how the truck is being loaded.

The "2-in-1" body or the body without sides is equipped with a double-acting tail gate. The tail gate folds down from the top the same as an express tail gate. It is supported in this position by chains and hooks. By raising the tail gate and releasing the operating device, the tail gate opens outward the same as an ordinary dump body.

The operating device is placed at the bottom of the body, so that it will be protected against hard blows or bumps. There are two handles for the operating mechanism. Should the driver desire to open the tail gate before the body is raised, he can do so. Should he desire to open the tail gate after the body is raised, the handle is still within reach.

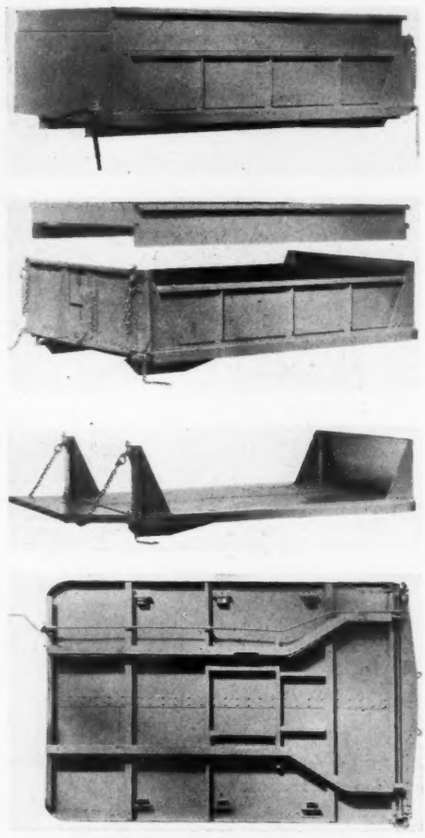
Stake pockets are located 3 to 4 in. from the outside of the body.

The longitudinal sills are made for a Hydro hoist. The hoist pistons are placed in a box-shaped steel frame and the flared sides extend out over the truck frame.

In the tail gate of the body is placed a sliding door, made 17 in. wide, for handling coal. Two hooks are placed on the side of the chute and extend out 6 in. They are of sufficient width to accommodate a standard coal bag.

The chains at the lower part of the tail gate belong to the chain spreader device. The links of the chain may be placed on a fork, which is riveted to the floor of the body beneath the flange of the floor. By so doing the opening of the tail gate can be regulated and gravel, sand or crushed rock and other building material may be spread accordingly.

This body is especially adapted for use with the Hydro hoist, which is mounted under the body. Proper load distribution makes it possible to haul a greater variety of material.



Four Views of the Combination Body Introduced by the Heil Co., Showing Three of the Conversions and Under Side of the Platform.

Adams Commercial Trailer

The Adams trailer, offered by the Adams Trailer Corp., Garden City, Long Island, N. Y., is of the semi-trailer type and can be instantly hitched to any make car. Appearance and finish has been given careful attention, and the construction is said to be such as to prevent any possible injury to the car, pulling it even though the trailer may be used continually and under adverse conditions. The makers claim that this trailer will trail perfectly at any speed.

The Model A, standard basic trailer, which is rated at 1500 lb., allowing for overload, is of 14-gage all steel construction and is provided with a tail gate. The 1-in. wood floor is bracketed with steel strips. Easy riding action is obtained through the use of 7-leaf, 1½-in. springs equipped with grease cups. The 30 x 3½-in. Goodyear non-skid tire equipped wheels run over Vulcan roller bearings on a 1⅜-in. axle.

Roping hooks are provided on the sides and the hitch is of the ball and socket type, which operates instantaneously.

The trailer length from tip to end is 109 in.; length, full width of body, is 84 in.; width, 48 in.; height, 13 in.; and weight, 260 lb. net.

If desired, these trailers can be equipped with demountable rims or oversize, 31 x 4-in. tires at a slight additional cost.

Adams trailers are shipped knocked down and crated, unless otherwise specified. The assembly of these trailers is, however, a simple process and can be accomplished easily by anyone.

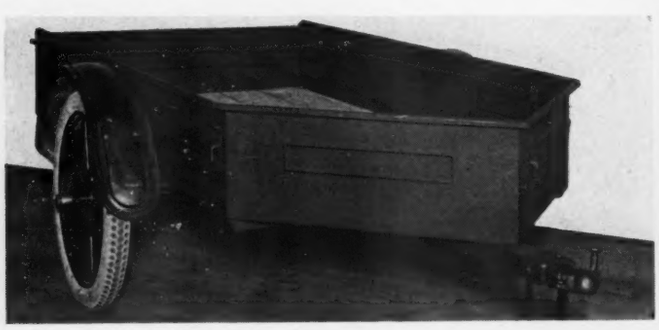
Ranger Producers Build New Factory

The Southern Motor Manufacturing Association, Ltd., Houston, Tex., has just completed another modern unit of its factories on its large plant site on the Houston Ship Channel.

The addition is an up-to-date building of steel and glass construction, 208 feet in length by 60 feet width, and equipped with the most modern of machinery.

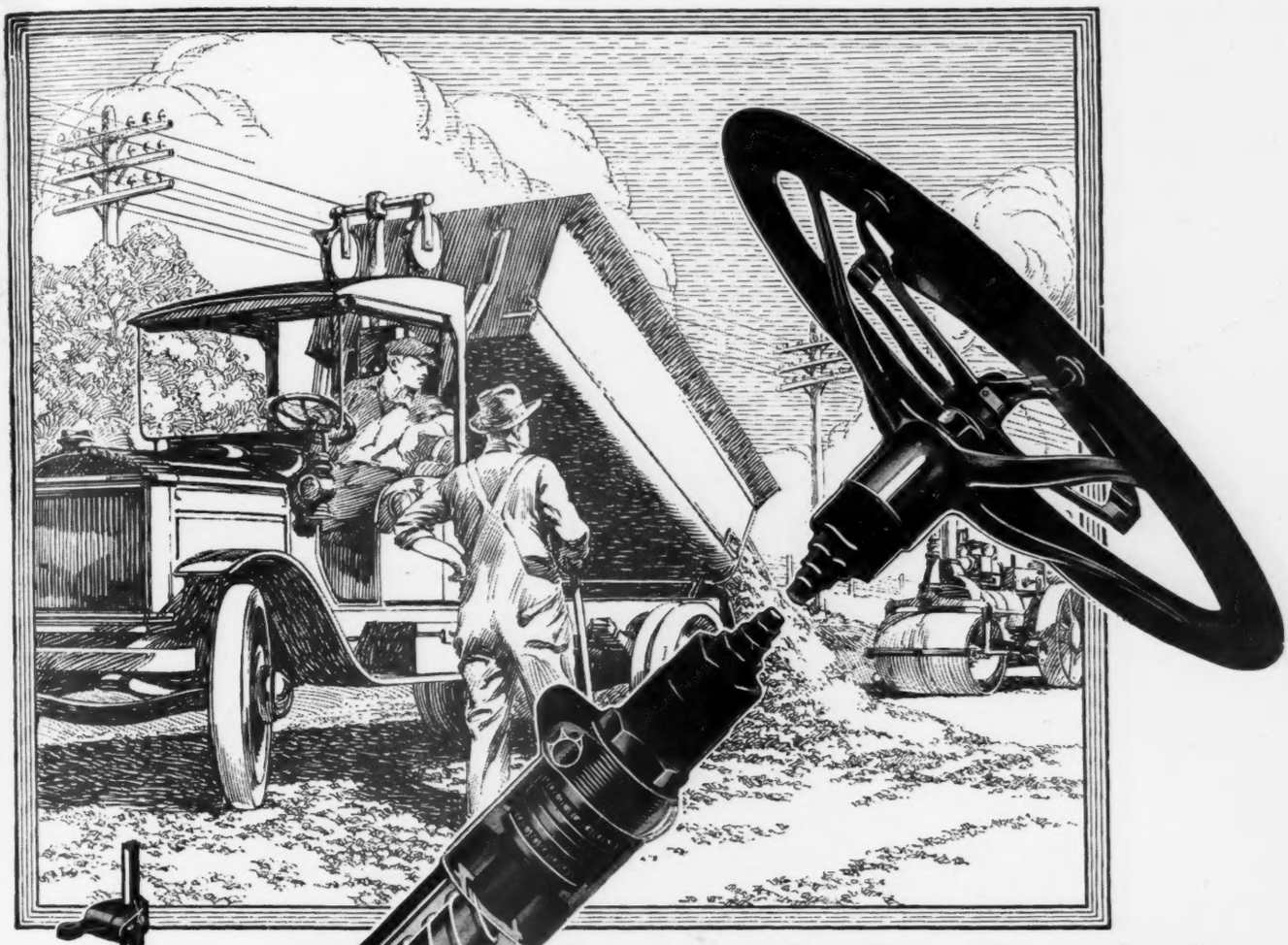
Body Company Again Reduces

A second reduction within the last four months is announced by the United Automotive Body Co., Euclid at 49th St., Cleveland, on all its body production. The reduction this time averages 25 per cent and is said by the manufacturer to place prices in many cases below the prewar level.



Close-up and Train of Adams Trailers

The left view shows a Model A standard basic Adams trailer and the right view shows a train of ten Adams trailers making two turns around persons standing in the center of the road. Each trailer tracks two inches off



Building Its Own Road Bed
— *to Haul America's Freight*

The transportation problem of America will eventually be worked out—not on steel rails only, but on hard pike roads; not with engines and box cars only, but with motor trucks and trailers. This means more roads—better roads. The motor truck is today helping to build better roads that it may use them to the benefit of the community.

Ross Steering Gears are playing an important part in this work. The exclusive screw and nut design provides an enormous bearing surface. This bearing surface, in turn, means greater efficiency, greater safety and reliability, and easier steering—both in the motor trucks that are employed in building the road-bed and in those which later will haul freight and express over it. Ross Gears are now standard equipment on 455 different truck models from 178 different manufacturers.

Further Information Furnished on Request

ROSS GEAR & TOOL COMPANY

760 Heath Street Lafayette, Indiana, U.S.A.

ROSS STEERING GEARS

THE STEERING GEARS THAT PREDOMINATE ON MOTOR TRUCKS

TRUCK EQUIPMENT AND APPLIANCES

Victor Governors

The Victor governor, lately introduced by the Victor Engineering Co., Allentown Pa., is of the constant-motor-speed type, and has been designed for service on trucks, tractors, electric lighting units, etc. The makers state that it has successfully met with the severest operating conditions, governing engine capacities of from 10 hp. to 2000 hp.

This governor limits the engine's speed directly by curtailing the gasoline flow. It is located between the carburetor and engine and is driven by a solid shaft connected to the timing gears, camshaft or magneto shaft. It may also be driven from the propeller shaft.

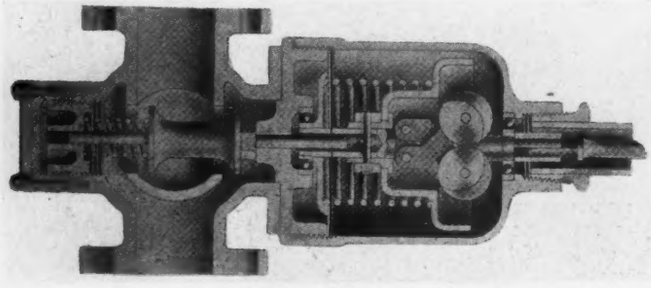
The construction of the revolving weights is such as to maintain a definite position for any given speed and the regulating force is ample to move controlling valve for accurate regulation.

By studying the accompanying illustration the construction of this governor may be readily understood. The governor and valve is mounted in a casing forming a complete unit, totally enclosed, and may be locked and sealed, making it tamper-proof. The double ported valve has been adopted for balance and because it tends to prevent interrupted operation.

Another feature of construction is the valve spool, which enters into the port like a plug. As may be seen from the illustration in this spool lies the control of gas flow.

The outer casing of the valve body is of aluminum. Ball bearings are used on the governor spindle. The governor weights are suspended from a trunnion block, which is fitted on the spindle and locked with the same pins the weights are suspended from. The reaction of the helical spring, which gives the load on the governor, presses the bell-housing against the weight. The bell-housing, spring and spring retainer revolve with the governing element, due to the friction caused by resting against the weights, but are free to slide, when sudden changes of speed take place, thereby eliminating internal friction of the governor, due to inertia.

This governor is made in 1 in., 1¼ in. and 1½-in. valve sizes, as standard equipment for trucks and tractors.

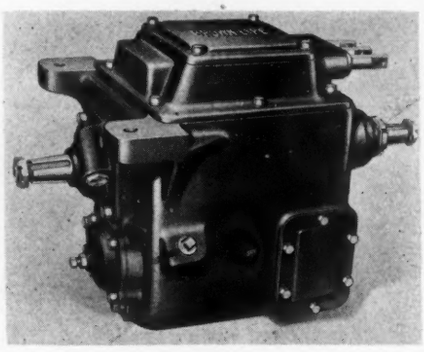


New Victor Constant-Motor-Speed Type Governor Designed for Service on Trucks, Tractors, Etc.

Brown-Lipe Gear Introduces New Transmission

The Brown-Lipe Gear Co., Syracuse, N. Y., has added another transmission, known as Model 55, to its already extensive line. This new product is designed to fill a gap heretofore left open and has several individual features.

It is of the main frame type and, as its designating number implies, is substantially midway in capacity between the company's present Models 50 and 60,



New Brown-Lipe Model 55 Intermediate Capacity Transmission

making it especially suited for 3 to 3½ ton trucks that are subject to hard usage. It is furnished with either overhead or side shift, as chassis requirements may make desirable.

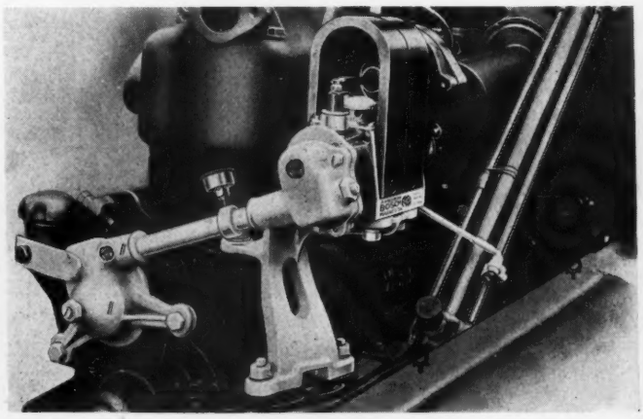
Regular features of this transmission are selective gears that give four speeds forward and reverse; a rear main shaft bearing cap that takes a speedometer drive; an oil filler that marks the height to which oil should be maintained, and two standard pads, one on the right and one on the left side of the case, which are respectively intended for a one-speed power-take-off and a tire pump.

Optional arrangements include overhead or side shift, as noted above; adjustable taper roller bearings or ball bearings on main and counter-shafts, and, when a power-take-off is not used, the mounting of the pump on the right side. This last can be accomplished at any time by adding a two-inch block furnished by the pump manufacturer.

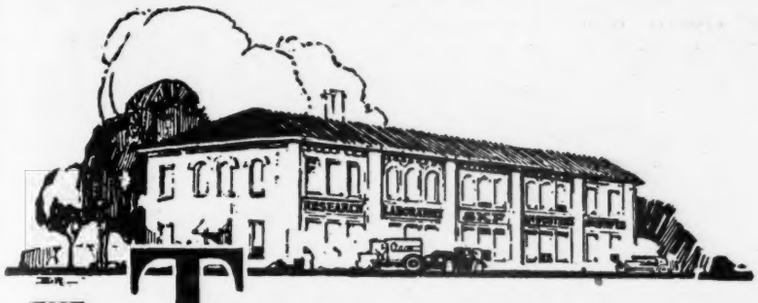
Bosch Introduces Magneto Attachments

Two new products lately placed on the market by the American Bosch Magneto Corp., Springfield, Mass., have proved especially interesting to the trade. They are a new shaft drive Bosch magneto attachment for Fords and Fordson tractors. Each of these attachments is made up of a standard Bosch magneto with a fitting for mounting it on the engine. The magneto is driven by a rotating shaft which extends from gears mounted on the camshaft to the magneto. The fitting is simple, rugged, and compact. It can be easily installed without removing any vital part of the engine.

When the Bosch Ford attachment is fitted to a Ford engine the old distributor coils and the "mystic maze" of wires is done away with, the magneto furnishing high tension ignition current without the use of step-up coils. If the car has starting and lighting equipment the battery is used for that work alone. The Bosch fitting operates noiselessly and the only attention it requires is an occasional turn of the grease cup on the shaft.



Showing the New Shaft Drive Bosch Magneto Attachments for Fords and Fordson Tractors



SKF
Research Laboratory established at Philadelphia to co-operate with the Gothenburg Laboratories in the study of the American Manufacturers' friction problems.

THE technical advice brought you by our engineers embodies the experience of highly trained organizations in all parts of the world in the solving of friction problems.

This international experience is both technical and practical and is acquired in co-effort with the best international research endeavor.

SKF service in America is linked to this international experience. Its tangible evidence is found in products marked "**SKF**" and in the advice supplied you by our engineers.

SKF Industries, Inc.
165 Broadway, New York City

Supervising at the request of the stockholders.
- The Hess-Bright Manufacturing Co.
- Skayef Ball Bearing Co.
- Atlas Ball Co.
- Hubbard Machine Co.
- **SKF** Research Laboratories

SOUTHERN OIL & FEED MILLS, INC.

Cable Address, "Jonesco"

MILLS
PETERSBURG, VA.—SUFFOLK, VA.

PRINCIPAL OFFICE
PETERSBURG, VA.

Codes Used { A B C—5TH ED. (NOT OVER) / WORTH'S—7TH ED. REV. / ROBINSON—REVISED.

March 26, 1920.

S K F Industries,
165 Broadway,
New York City.

April 23,1920.

Gentlemen:

Attention Chief Engineer

We wish to thank you, and to say that we appreciate highly your sending ******** here to assist us with the trouble we were having with ball bearings in our mill. Mr. *******, we believe, has made us some very valuable suggestions, and we believe, his visit to us is going to prove most profitable. We wish also to thank you for your promptness in forwarding the two 6316 bearings, which came in very promptly.

It is indeed a pleasure to have business relations with a concern that chooses such a policy, as you have shown to us in this instance.

Again thanking you most cordially, we are

Yours very truly,

SOUTHERN OIL & FEED MILLS, INC:

BY:(Signed) [illegible]

619

SKF

Among these products now offered are:

Single row deep groove ball bearings. Thrust bearings, Steel balls. Double row self aligning ball bearings. Transmission equipment.

Dietz Electric Headlights for Motor Trucks

The R. E. Dietz Co., 60 Laight St., New York City, is offering electrical lighting equipment especially designed for use on motor trucks. This equipment, constructed to stand up for an indefinite length of time under road shocks and the excessive vibration of heavy-duty trucks, consists of head and rear lights, known as the Radio and Vigilant, respectively. The

Specially Designed Dietz Headlight for Heavy-Duty Trucks

construction of these lights are said to be such as to solve, in a simple, practical way, the problems of lighting which are peculiar to truck operation. They combine rugged strength, pleasing design, lighting dependability and other features of construction and points of usefulness.

The shell of the headlight consists of the following two pieces.

The body is drawn from one piece of 18 gage cold rolled steel, and the lens rim is screwed to the body and is drawn from the same material.

The two sockets which are spot welded to the body are fitted with set screws and lock nuts and designed for forked brackets. A parabolic reflector made of a non-rusting material and highly nickel plated is used, and the lens is of the deflecting type. A standard candle power bulb for current of 6 to 8 volts is furnished with each lamp.

The connector is of the adjustable focusing type and comes complete with a brass plug of either the single or double contact type. Two knurled nuts that work against each other, and are fitted on the connector, one inside and the other outside of the lamp, lock the connector, reflector and bulb rigidly in position and in correct focus.

The outside of this lamp is finished in baked black enamel and the inside is coated with baked white enamel. The

This Lamp When Disassembled Consists of Very Few Parts

outside diameter of this lamp is 7½ in., and the list price is $10 per pair.

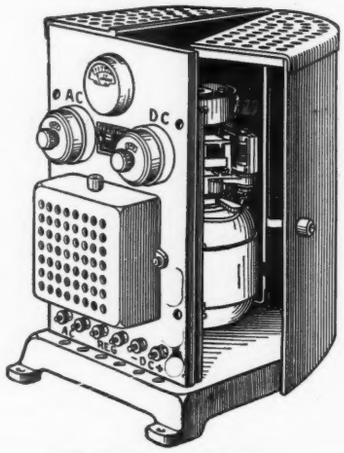
Dietz tail lights are practically of the same construction as the headlight lights, except that it's strictly one piece. Other slight differences are as follows:

Socket is riveted on and is designed for a round holder. The body of the lamp is 3¼ in diam. and the ruby lens is 3 in. diam. A removable, heavy spring retaining wire holds the two in place. A regulation white light for illuminating the license plate is also provided. The list price is $2.10 each.

France Rotary Rectifier

The maker of the F. F. Rotary Rectifier, the France Mfg. Co., Cleveland, O., states that this instrument will put 80 ampere hours in 12 6-volt batteries at a cost of $.05 to $.10 per battery, depending upon local cost for alternating current. This outfit does not create electricity, but simply rectifies it. A small fractional horsepower motor serves to drive a rotary switch in step with the alternations of the current, and from this the charging current is collected by carbon brushes, as in generators.

To the motor shaft is connected a centrifugal cut-out, the contacts of which close in, if for any reason the line currents fail or the driving motor should



F. F. Rotary Rectifier

slow down, making it impossible for the group of batteries on charge to empty through the rectifier, because the charging circuit is broken.

New Hart-Bell Truck Car

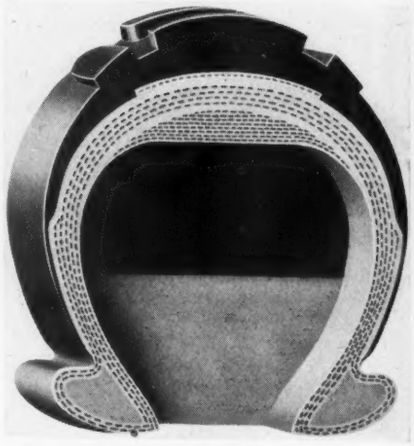
A new 5-ton double-screw jack, standing 9 in. high and having a lift of 12 in. was recently added to the line of the Hart-Bell Co., Inc., New York City. This double-screw lift, which makes this lift possible, is operated laterally by a 15-in. wood and steel ratchet handle. The head of this jack is swiveled and thrust is taken by a bronze thrust bearing. The ratchet is a drop forging.

The top or inner screw is steel and the outer screw is a malleable iron casting. The base also is malleable cast. The inner screw does not start operating until the outer screw is entirely extended. The approximate weight of this jack is 12 lb. and the price $12.

Dayton Airless Announces New Construction

Many important changes have recently been adopted in the new construction of Dayton Airless Tires, which its manufacturers, the Dayton Rubber Mfg. Co., Dayton, Ohio, say have added greatly to its wearing qualities.

The tire is built with piers of rubber, set about an inch apart, and vulcanized as parts of the tire itself. These piers



Cross Section of the Recently Announced Dayton Airless, Showing Construction

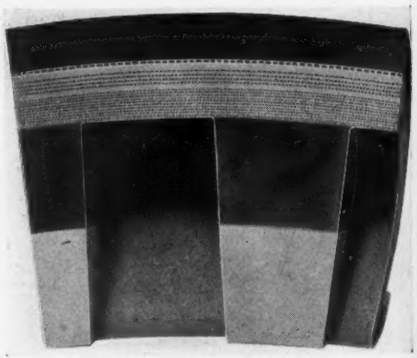
take the place of an inner tube. They were formerly made of one kind of stock, but now they are made of what is known as two-stock compound.

The lower half is made of a compound that adds strength and endurance to the side walls and is of sufficient density to prevent rim cutting. The upper, or outside half of the pier, is made of much more resilient, springy, shock-absorbing rubber, said to add to the easy-riding qualities of the tire and insure flexibility.

The new breaker strip is of heavier material, and tests indicate that the change in this feature eliminates tread separation.

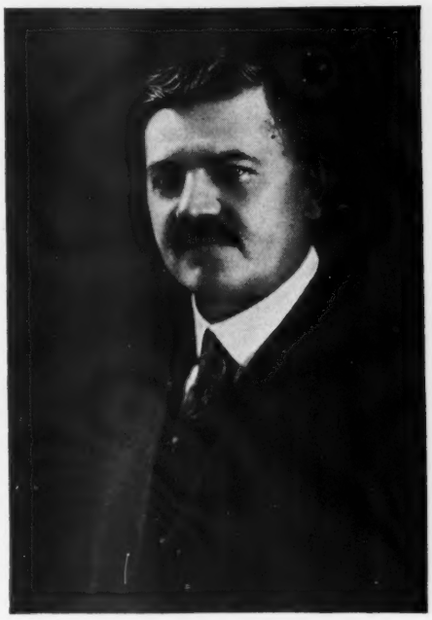
Another change is in the tread. The entire tread of the tire has been increased 1-16 of an in., which is said to give a wider bearing surface on the road.

Formerly the tread was built by laying strips of rubber one on top of another. The result of this construction was what is known as a straight-grain tread. This construction was found unsatisfactory, because whenever a break occurred it had a tendency to split.



Section Through Center

Mr. Albert Fisher's Story About Standard Trucks



MR. ALBERT FISHER

WHEN I started, nearly a decade ago, to develop the Standard Truck, it was on the conviction born from my twenty-five years of constructive experience in building commercial vehicles for heavy-duty hauling.

This long experience in the horse-drawn vehicle business had convinced me that a motor truck built wholly of quality standard parts, properly designed and carefully put together, was the coming vehicle for highway transportation.

I then set out to get the design right. The benefits of my commercial vehicle experience I utilized to the fullest possible advantage in the design. Then, I had a number of practical automotive engineers, today prominent in the industry, carefully go over my design and assist me in correcting the faults.

Having settled the problem of the design, the next important factor was the selection of parts to go into that design. In the horse-drawn vehicle business I had always been in the habit of buying only the highest grade of materials procurable. I decided to continue this policy in selecting the units that went into the make-up of Standard Motor Trucks.

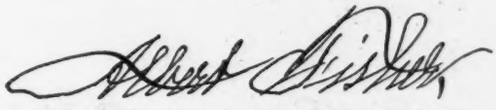
For example, I had used Timken axles and bearings in the horse-drawn vehicle that I built. Long experience had demonstrated their quality. So in all Standard Motor Trucks the front and rear axles and bearings are and have always been Timken.

After an investigation of the various makes of engines on the market, considering both efficiency and ease of securing service, I selected the internationally known Continental. And, for a carburetor, I wanted something efficacious and still extremely simple. A long search lead me to adopt the Stromberg. After an examination of transmissions and clutches, I was satisfied that the dependable Brown-Lipe make headed the list. For a universal joint I choose the well-known Spicer. The time-tried Eisemann magneto had appealed to me from the outset, and it has always been embodied in Standard Truck construction.

In workmanship, I exacted the identical high standards that I had taught and practiced in the horse-drawn vehicle business. I demanded that each part be carefully and properly fitted. I always insisted that quality instead of quantity be the guiding ideal among the men in the plant.

And having, in addition to complete mechanical equipment, blacksmithing, woodworking, trimming, and painting departments, it is possible for our organization to give more attention to the details of building trucks. It is commonplace to see frequently Standard Trucks that were sold six years ago with the paint still in good condition.

In this message I have tried to give what are, I believe, the frank reasons why thousands of owners of Standard Motor Trucks have found their trucks so serviceable and long lived that they are universal in their declaration that the Standard is "all the name implies."



President, Standard Motor Truck Co.,
Detroit, Mich.

Through the use of a new machine recently put into operation the tread is differently constructed, hence the former difficulties have been eliminated. This machine operates under heat and embodies knives or blades, which chop the rubber into small particles and by pounding and rubbing under high temperatures the rubber is caused to become sufficiently pliable to form the tread at one operation.

Still another important change is the increased thickness of the gum strip, which is placed between the annular rib and the carcass of the tire. The gum strip between the tread and the carcass has also been changed, so that it covers the entire body of the tire and results in a closer adhesion and added strength to the whole construction.

In spite of the changes in the construction the company states that there has been practically no change in prices.

Champion Air and Water Stand

A stand that not only provides a more convenient and satisfactory method of supplying air and water, but one that also attracts the attention of all truck operators and car owners because of its conspicuous design, was recently put on the market by the Champion Pneumatic Machinery Co., Chicago, Ill. Not alone is the stand attractive, but is entirely utilitarian as well, in that the ease and simplicity of its operation allows much quicker and better service.

This stand is equipped with the latest improved automatic air valves, water valves, 300-lb. air gage, Conqueror air hose and Champion patented hose clamps and handle. The base is large and roomy, with door, which makes installation and connection to air, water and lighting lines a simple matter.

The body of the stand is composed of 3½-in. wrought iron upright. The construction of the swivel joint is such as to permit the extension arm, when pulled to a horizontal position, to reach all wheels of the truck or car. The hose extension is 17½ ft. long and is equipped with a counterbalance.

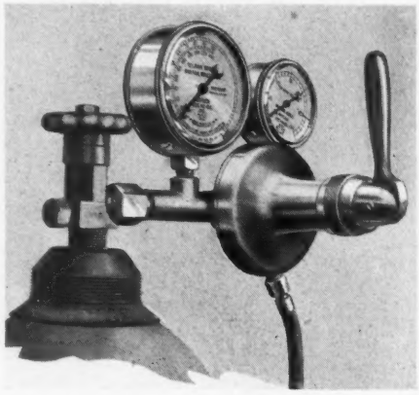
It is furnished with or without water connection, and the standard color is black. All necessary pipes and connections from base of stand are furnished. The height from the ground to top of globe is 8 ft. 2 in.

Attractive Air and Water Stand Offered by the Champion Pneumatic Machinery Company.

Tolman Oxygen Regulator

A new heavy-duty model of oxygen regulator is being offered to the trade by the Tolman Manufacturing Co., 19 W. Third St., Boston, Mass.

The accompanying illustration shows one of these new models attached to an oxygen tank. The lever does not rotate on the regulator. The adjusting collar is turned down to secure the proper working pressure and the lever is then thrown down. The bearings in this lever are hardened steel.



Tolman Heavy-Cutting Oxygen Regulator

Two gages are provided on this regulator, a 3000-lb. safety spring back tank gage and a 150-lb. line gage.

Liberty Airless Tire

The Liberty Airless Tire Corp., Carey, O., recently introduced a new airless tire, claimed to be entirely new and revolutionary in type. It is a tubeless cushion tire of high resiliency, composed wholly of rubber and fabric, and is constructed with a small central cavity to further increase easy riding.

The tread and outer walls are composed of tough wear resisting rubber, and the interior consists of highly resilient red rubber, reinforced by layers of fabric.

In appearance the tire is an exact counterpart of a pneumatic when assembled on the wheel, and is interchangeable with any pneumatic on the same rim.

Being airless, it naturally cannot puncture or blow out, and its makers report an average mileage in service of between 25,000 to 30,000 miles without trouble, care or repair.

Perpetual Air Bag

The Perpetual Air Bag is constructed by the Perpetual Air Bag Company, 2103 S. Michigan Ave., Chicago, Ill. All metal parts such as caps, are of cold rolled steel, and fittings are standard—Schrader connections and valves.

Perpetual Air Bag

This bag readily expands to an exact fit, holds the tire firmly, and requires no padding or adjustment

The bag itself is made of two sections of inner tubing protected by a stockinette covering. One of the features of this bag is the fact that its only wearable part can be renewed at no expense by simply fitting two good pieces of scrap inner tubing.

It readily expands to an exact fit, holding the tire firmly while curing and requires no padding or adjusting. Sells at following prices: 3-in., $8.50; 3½-in., $9.50; 4-in., $10.50; 4½-in., $11.50; 5-in., $15.

Bearing Compound

Kwik-Ak-Shun is the name of a new compound being marketed by the United States Product Co., Highland Building, Pittsburgh, Pa. This compound is said to facilitate better fits and quicker work on wearing parts of babbitt brass, bronze and all other softer metals.

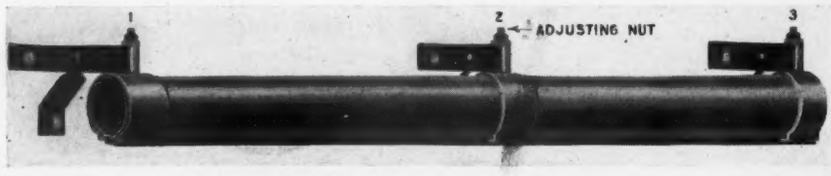
This material is composed of large and small crystals. It is a powder that is mixed with oil and applied as a paste.

The large crystals work on the bearings so that in a few minutes they work sufficiently to allow the small crystals to come in contact with the brake up against the surface under treatment. This physical process continues until an action occurs that neutralizes the effectiveness of the large crystals. The bearings can then be wiped clean with a rag.

Garage Folding Doors

Lawrence Bros., Sterling, Ill., are introducing an electric garage set which is a standard outfit designed to fit the usual length and breadth or thickness of garage folding doors. This outfit is sold complete with all parts and fittings ready for immediate installation and operation.

Many desirable features are incorporated in this electric garage set. The hangers are adjustable, which permits them to be accommodated to sagging, warping and swelling that sometimes occur in doors when they are put up. In remedying these conditions this set insures permanently a smooth and easy operating job. Installation is effected easily and quickly by adhering to a simple set of instructions which accompany each set.



Lawrence Electric Garage Door Rail

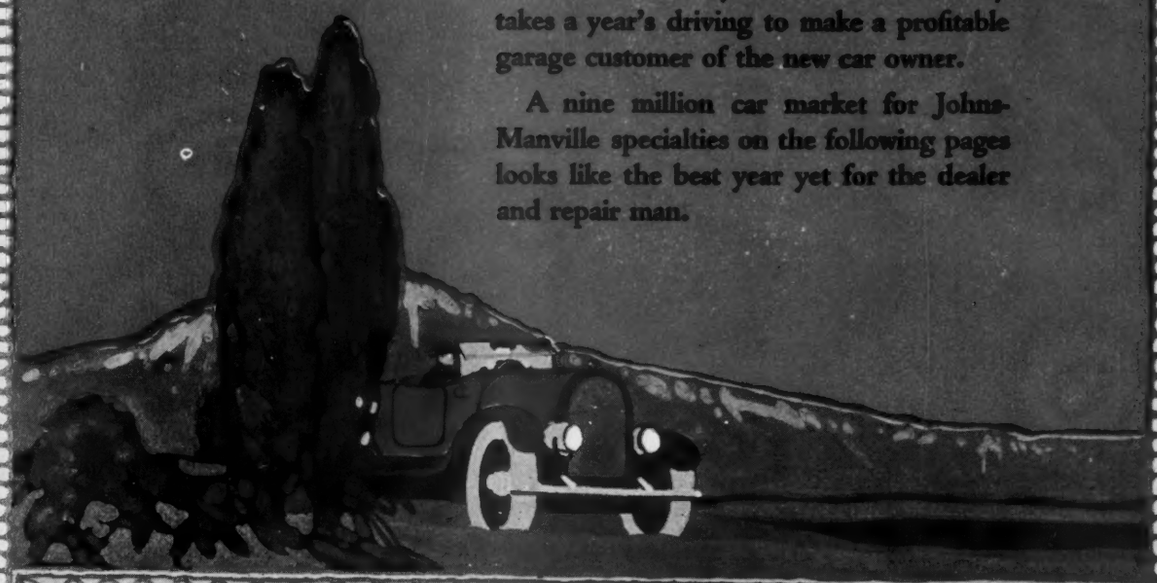
Through—
Asbestos
and its allied products
INSULATION
BRAKE LININGS
ROOFINGS
PACKINGS
CEMENTS

Two million new customers for the dealer

LAST year was the biggest year that automobile selling ever had. For it put two million new cars on the road—in addition to the seven million in operation the year before.

That means two million more customers for the dealer this year. Because it usually takes a year's driving to make a profitable garage customer of the new car owner.

A nine million car market for Johns-Manville specialties on the following pages looks like the best year yet for the dealer and repair man.



JOHNS-MANVILLE
Automotive Equipment

CAPO-BIANCO

Your business has

In brake lining

BRAKE LINING is a necessity, and good linings have a steady, ever-increasing demand.

Johns-Manville Non-Burn builds profitable business because good material + good workmanship = a satisfied customer.

And another thing—you can always ban on convenient stocks of Johns-Manville Non-Burn to draw on for your requirements (not the list of distributors on page four).

Through Johns-Manville national advertising people have come to know that brakes are safer and last longer when lined with Non-Burn.

Johns-Manville "Noark" Automobile Lighting Fuses

—absolute protection for the electrical circuits. Glass or fibre tubes.

Send for booklet listing American cars and size of fuses for each.

Johns-Manville Automobile Tape

—strong, does not fray, stays sticky. We are so sure of this tape that we guarantee it.

Johns-Manville Automo... Seigelite Sheet Packi...

—resists the action of wat... and gasoline. For gasketing ... manifolds, crank or trans... cases, differential housings ... buretors, clutch and timing ... covers—in the right way.

e good on these items

In clutch facing

A QUICK job in facing a clutch brings both direct and indirect profit to the dealer. You couldn't have anything quicker than a ready-made facing for the particular car you're working on—like this Johns-Manville Asbestos Friction Clutch Facing.*

This type of facing is made up to fit the different representative cars requiring disc facings—packaged stock that you can carry n your shelves to obviate delay on a facing b.

Any of the distributors on the next page can supply you right out of stock.

**A development through Johns-Manville experience on friction blocks for heavy industrial cranes—machined on face to make engagement and release easy and to cut down the slip that wears out ordinary facings.*

Johns-Manville Hubodometer

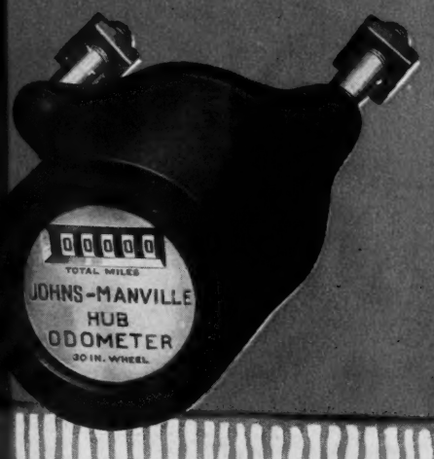
simple and sturdy yet mar- usly accurate. Records mile- whether the wheels move ard or backward. Can be hed in a few minutes.

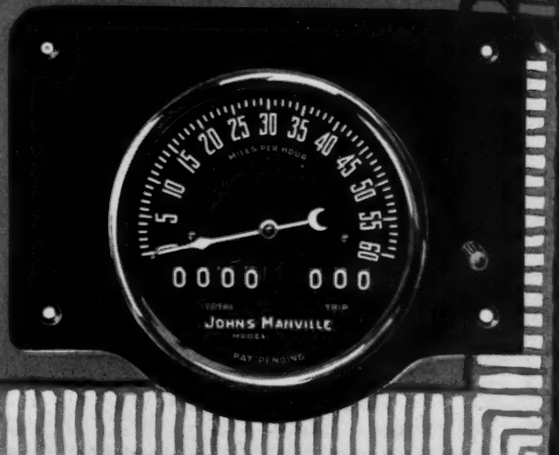
Johns-Manville Automotive Service Sheet Packing

—for use wherever high temperatures or high pressures must be withstood; makes a tight job on intake and exhaust manifolds and cylinder heads.

Johns-Manville Speedometer for Ford Cars

—meets the new condition on Ford cars equipped with starters. Mounting plate matches the finish of instrument board, and can be installed in a few minutes. The line includes other models for Fords not equipped with starters.





Pick your Distributor from this List

Alabama
The I. J. Cooper Rubber Co., Birmingham
Moore-Handley Hardware Co., Birmingham
Johnson Tire & Auto Co., Montgomery

Arkansas
Crow-Burlingame Co., Little Rock

California
Chanslor & Lyon Co., Fresno
Chanslor & Lyon Co., Los Angeles
Featherstone, E. A., Los Angeles
McCoy Motor Supply Co., Los Angeles
Waterhouse & Lester Co., Los Angeles
Weinstock-Nichols Co., Los Angeles
Western Rubber & Supply Co., Los Angeles
Chanslor & Lyon Co., Oakland
Weinstock-Nichols Co., Oakland
Kimball-Upson Co., Sacramento
P. W. Gavin Company, Inc., San Diego
Chanslor & Lyon Co., San Francisco
Electric Appliance Company, San Francisco
McCoy Motor Supply Co., San Francisco
Waterhouse & Lester Co., San Francisco
Weinstock-Nichols Co., San Francisco

Colorado
Auto Equipment Co., Denver
Foster Auto Supply Co., Denver
Motor Accessories & Tire Co., Pueblo

Connecticut
Motor Tire Service Co., Putnam
Hesse & Hoppen Co., New Haven

District of Columbia
National Electrical Supply Co.
Rubel, Chas., & Co.

Florida
Baughman Company, Norman G., Jacksonville
Baughman Company, Norman G., Miami
Baugman Company, Norman G., Tampa

Georgia
Alexander-Seewald Co., Atlanta
Cody Co., W. E., Columbus
The I. J. Cooper Rubber Co., Atlanta

Illinois
Automobile Supply Co., Chicago
Chicago Automobile Supply House, Chicago
Electric Appliance Company, Chicago
Motor Car Supply Co., Chicago
Tank Hardware Co., Quincy
Universal Automotive Supply Co., Chicago
Washington Auto Supply Co., Washington

Indiana
Orr Iron Co., Evansville
Lomont & Co., Ft. Wayne
The I. J. Cooper Rubber Co., Indianapolis
The Gibson Co., Indianapolis

Iowa
Cedar Rapids Pump Co., Cedar Rapids
Sieg Co., Davenport
Herring Motor Co., Des Moines
Repass Auto Co., Waterloo

Kansas
Massey Hardware Company, Wichita
Southwick Auto Supply Co., Topeka
Watson-Weldon Co., Salina
The Frank Colladay Hardware Co., Hutchinson

Kentucky
Peaslee-Gaulbert Co., Louisville

Louisiana
Electric Appliance Company, New Orleans
Shuler Auto Supply Co., New Orleans

Maine
Bigelow & Dowse Co., Bangor
The Farrar-Brown Company, Inc., Portland

Maryland
Auto Supply Co., Baltimore
Cousins & Owens, Baltimore

Massachusetts
Bigelow & Dowse Co., Boston
Linscott Supply Co., Boston
Wetmore-Savage Co., Boston
Motor Tire Service Co., Fitchburg
Bigelow & Dowse Co., Springfield
Duncan & Goodell Co., Worcester
Motor Tire Service Co., Worcester

Michigan
Bowman Gould Co., Detroit
Roehm & Davison, Detroit
Tisch Auto Supply Co., Grand Rapids

Minnesota
Janney-Semple-Hill & Co., Minneapolis
Kelley-Duluth Co., Duluth
Minneapolis Iron Store Co., Minneapolis
Reinhard Bros. Co., Minneapolis
Williams Hardware Co., Minneapolis
Nicols, Dean & Gregg, St. Paul

Missouri
Joplin Supply Co., Carthage
Joplin Supply Co., Joplin
The Faeth Company, Kansas City
Ayers Farmer Auto Supply Co., St. Joseph
Beck & Corbitt Iron Co., St. Louis
Fred Campbell Auto Supply Co., St. Louis
Geller, Ward & Hasner, St. Louis
Rogers & Baldwin Hardware Co., Springfield
Joplin Supply Co., Webb City

Montana
Northwestern Auto Supply Co., Billings

Nebraska
Nebraska Buick Auto Co., Lincoln
Western Auto Supply Co., Omaha

Nevada
Nevada Auto Supply Co., Reno

New Hampshire
Thompson & Hoague Co., Concord

New Jersey
Economy Auto Supply Co., Newark

New York
Albany Hardware & Iron Co., Albany
Martin Evans Co., Brooklyn
Strauss Co., Joseph, Buffalo
Barker, Rose & Clinton Co., Elmira
Picard & Co., Inc., A. J., New York
Roberts Electric Supply Co., H. C., Syracuse

North Carolina
Carolinas Auto Supply House, Charlotte

North Dakota
Grant, J. D., Fargo

Ohio
The Penn. Rubber & Supply Co., Akron
C. & D. Auto Supply Co., Cincinnati
The I. J. Cooper Rubber Co., Cincinnati
The Penn. Rubber & Supply Co., Cincinnati
The I. J. Cooper Rubber Co., Cleveland
The Penn. Rubber & Supply Co., Cleveland
The I. J. Cooper Rubber Co., Columbus
The Penn. Rubber & Supply Co., Columbus
Justus & Parker Co., Columbus
The I. J. Cooper Rubber Co., Dayton
The I. J. Cooper Rubber Co., Toledo
The Penn. Rubber & Supply Co., Toledo
The Penn. Rubber & Supply Co., Youngstown

Oklahoma
Joplin Supply Co., Commerce
Severin Tire & Supply Co., Oklahoma City
Joplin Supply Co., Tar River
Tulsa Motor Supply Co., Tulsa

Oregon
Wiggins Company, Inc., Portland
Chanslor & Lyon Co., Portland
Waterhouse & Lester Co., Portland

Pennsylvania
General Motor Supply Co., Altoona
The Penn. Rubber & Supply Co., Erie
Front Market Motor Supply Co., Harrisburg
Johnstown Auto Co., Johnstown
The Penn. Rubber & Supply Co., Oil City
Berrodin Rubber Co., Philadelphia
Gaul, Derr & Shearer Co., Philadelphia
Motor Accessories Co., Allentown
Roberts Electric Supply Co., H. C., Philadelphia
Dyke Motor Supply Co., Pittsburgh
Lansing Bros., Inc., Scranton
General Auto Supply Co., Lancaster
General Auto Supply Co., Lebanon
General Auto Supply Co., York

Rhode Island
Belcher & Loomis Hardware Co., Providence

South Carolina
Franke Co., Inc., C. D., Charleston

South Dakota
L. & L. Motor Supply Co., Sioux Falls

Tennessee
Southern Auto Supply Co., Chattanooga
The I. J. Cooper Rubber Co., Knoxville
The I. J. Cooper Rubber Co., Memphis
Ozburn-Ahston & Co., Memphis
Auto Supply Co., Nashville
The I. J. Cooper Rubber Co., Nashville

Texas
Electric Appliance Company, Dallas
Tri-State Accessories Corp., El Paso
Meyer Co., Jos. F., Houston
The Southern Equipment Co., Houston
The Southern Equipment Co., San Antonio
McCauley-Ward Motor Supply Co., Waco

Utah
Inter-Mountain Electric Co., Salt Lake City
Motor Mercantile Co., Salt Lake City

Virginia
Owens-Merritt, Danville
Piedmont Hardware Co., Danville
Crump Co., Benj. T., Richmond
Meadows-Price Co., Roanoke

Washington
Chanslor & Lyon Co., Seattle
Reynolds & Reynolds, Seattle
Chanslor & Lyon Co., Spokane
Holley-Mason Hardware Co., Spokane
Chanslor & Lyon Co., Tacoma
Reynolds & Reynolds, Tacoma

West Virginia
Williams Hardware Co., Clarksburg

Wisconsin
Andrae & Sons Co., Julius, Milwaukee
Shadbolt & Boyd Iron Co., Milwaukee
Tisch Auto Supply Co., Milwaukee
Western Motor Supply Co., Milwaukee

CANADA

Alberta
Motor Car Supply Co., Calgary
Motor Car Supply Co., Edmonton
Marshall Wells Co., Limited, Edmonton
The Chapin Co., Ltd., Calgary
Wood, Vallance & Adams, Ltd., Calgary

British Columbia
Wood, Vallance & Leggat, Ltd., Vancouver

Manitoba
Wood, Vallance, Ltd., Winnipeg

Ontario
Whites, Limited, Collingwood
Wood, Alexander & James, Hamilton
Just Motors Limited, Ottawa
Wood, Alexander & James, Toronto
Bowman Anthony Co., Windsor

Saskatchewan
Wood, Vallance, Limited, Regina

Quebec
Omer De Serres, Montreal

JOHNS-MANVILLE, Inc., Madison Ave., at 41st St., New York City
Branches in 63 Large Cities
For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto

News of the Trade in Brief

(*Continued from page 43*)

Vim Now Controlled by Standard Steel Car Company

Automotive as well as business circles generally will evince a keen interest in the announcement that Standard Steel Car Co., of Pittsburgh, Pa., has taken over the Vim Motor Truck Co., of Philadelphia, and will operate it as one of its subsidiaries.

The entrance of such a well-established organization as Standard Steel Car, with headquarters at Pittsburgh, Pa., and subsidiary manufacturing concerns located in many Eastern, as well as Western, cities, into a dominating position in the motor truck field is significant in that it means the rounding out of a cycle of transportation units by a controlling company, with enormous facilities at its command.

Prestige and permanence is given to the Vim Motor Truck Co. by reason of its new affiliation. Either direct or through its allied companies it is now in the position of manufacturing commercial trucks from the raw material to the finished product. Inclusive of motors, axles, transmissions, frames and bodies the gamut of the factory processes is run and Vim Motor Truck Company has the advantage in that production cannot be held up for lack of control of basic units and source of supply.

Gear Association Elects Officers

The following officers were elected at the fifth annual convention of the American Gear Manufacturers' Association, held at Cincinnati, recently: F. W. Sinram, president (re-elected); R. P. Johnson, vice-president and general manager of the Warner Gear Co., Muncie, Ind.; first vice-president; B. F. Waterman, second vice-president, and F. D. Hamlin, secretary-treasurer (re-elected).

The work of the association, which is composed of practically all the gear manufacturers, is the standardization of the various products of the gear industry, in the industrial, as well as the automotive, fields.

Thomart is Reduced

A reduction of $690 in the price of the Akron Multi-Trucks chassis has been announced by the Thomart Motor Co., Kent, O., making the present price $1995 f.o.b. Kent. Commenting on the reduction W. G. Thompson, president of the company, said: "The recent improvement in business condition and the active demand for our product, we believe, warrants us in going forward with our production schedule with confidence that the public will manifest due appreciation of our efforts."

To Frame Rural Express Legislation

Resolutions authorizing the appointment of a committee to frame a uniform bill for submission to the various States for the encouragement and establishment of rural motor express were passed at a meeting of the Rural Motor Express Committee of the Federal Highway Council, held at Washington, May 20. J. H. Collins, chairman of the committee, and Manager Research Dept. of the Chilton Co., presided.

Those present were: Hon. Morris Sheppard, U. S. Senator, of Texas; Col. J. L. Wickes, Traffic Engineer, Public Service Commission of Maryland; J. N. Mackall, Chairman, Maryland State Roads Commission; J. C. Marquis, Associate Editor, The Country Gentleman; Tom Snyder, Secretary, Indiana Transfer and Warehousemen's Association, and the Indiana Highway Transport Association; S. M. Williams, Chairman, Federal Highway Council.

Senator Sheppard, in addressing the meeting, expressed keen interest in the work of the Federal Highway Council and desired to co-operate wherever possible. He predicted a future for the Rural Motor Express because of its great economic possibilities in building up not only the necessary transportation for the rural communities, but through it the increased production in many of the agricultural products which are so vital to the life of the general public by reason of better transportation, insuring at all times a safer and more dependable market. His belief in Rural Motor Express as a necessary part of the general transportation requirement of the country caused him to pledge his hearty support towards the preparation and enactment of such Federal legislation in the interest of Rural Motor Express as might be deemed expedient.

Colonel Wickes addressed the committee upon the experience of Maryland in attempting to encourage the establishment and operation of Rural Motor Express. He described the Maryland plan and agreed upon the importance of the committee getting behind the preparation and presentation to the various States of a uniform law so that Rural Motor Express might become a matter of discussion in the various State Legislatures, and thereby bring its advantages and importance to a greater realization by such bodies and the general public, so that proper legislation may be enacted for the encouragement and development of rural highway transportation.

A resolution was also passed instructing the chairman to issue a statement calling the attention of the commercial organizations throughout the country, motor vehicle manufacturers and allied industries to the danger of promiscuous promotion of highway transport lines, without regard to the conditions under which such companies would operate.

Battery Company Builds Recreation Park

A modern and completely equipped club house and recreation grounds now rapidly nearing completion will very shortly be turned over to its employes by the Electric Storage Battery Co. This playground is located near Rising Sun Avenue and Adams Avenue, Crescentville, Pa., on the property owned by the company.

The new structure and grounds are furnished with the most up-to-date equipment and include a baseball field, tennis courts, bowling alleys, shooting galleries, pool and billiard tables, gymnasium apparatus, shower baths, dining room, etc.

An interesting feature of the company's gift is the provision that the employes themselves assume entire charge and responsibility for the club house and grounds, including the cost of maintenance.

That the employes appreciate the spirit of the company and are ready to assume the responsibility of its care, is attested by the fact that 1500 employes have to date enrolled as members of the newly formed athletic association of the company. Each member pays an initiation fee and annual dues, the members having complete jurisdiction regarding the election of officers, appointment of committees, etc.

Engine Manufacturing Shows Big Increase Since 1914

WASHINGTON, D. C., June 6, 1921. —A preliminary statement of the 1920 census of manufactures with reference to the manufacture of engines, steam, gas and water, has been prepared by the Bureau of the Census, Department of Commerce. It consists of a detailed statement of the values of the various products manufactured during the year 1919.

The figures are based on returns from 371 establishments, with products for the year valued at $464,770,000. At the census of 1914 there were 446 establishments, with products valued at $72,121,000.

Figures on the internal combustion engines show manufacture in 1919 amounting to $58,548,000, against $10,122,000 in 1914.

Get Straight on This

Some confusion has been noted in the names of the Bridgeport Motor Co., Inc., Bridgeport, Conn., and the Bridgeport Motor Truck Co. The former firm builds marine and stationary engines and transmission machinery, while the latter has been building trucks. The concerns are in no way connected, the Bridgeport Motor Truck Co. now being, it is said, in the hands of a receiver.

Guilder Organizes Truck Company

One of the latest entries in the motor truck field is the Guilder Engineering Corp., of Poughkeepsie, N. Y., organized by Walter C. Guilder, well known truck engineer. Mr. Guilder recently resigned as general manager of the Truck and Tractor Division of the Traylor Engineering & Manufacturing Co., Cornwells, Pa., where he has been connected for two years, developing a line of trucks and a farm tractor model.

The new corporation will specialize particularly in the design and development of motor trucks and farm tractors, as well as their accessories. A complete laboratory where new designs are to be made and tested is to be erected.

Mr. Guilder's many years' experience as manager and engineer for such organizations as the Garford Motor Truck Co., International Motor Co., the Timken-Detroit Axle Co., and the Kelly-Springfield Motor Truck Co., qualifies him for this new undertaking.

Chamber to Hold Essay Contest on Safety

Five hundred prizes for the best essays on safety are offered to the grammar school children of the United States by the National Automobile Chamber of Commerce. The contest is under the direction of the Highway and Highway Transport Education Committee, a group of men from U. S. Government departments and other associations interested in motor transport and highways.

A trip to Washington and a gold watch will be the reward for first place. The second national prize will be a gold loving cup, and the third national prize a silver loving cup.

Prizes are to be awarded in each of the States and Territories, including District of Columbia, Canal Zone, Alaska, Hawaii, Philippines, and Porto Rico, as follows: First Prize—Gold Medal and $15 in cash. Second Prize—Silver Medal and $10 in cash. Third Prize—Bronze Medal and $5 in cash.

There will be a large number of prizes of the Third Class in many States, in addition to prizes named above. These additional prizes will be pro rated among the different States in proportion to the number of children enrolled in the grammar grades.

Trade Council Has Beneficial Meeting

Much interest centered around the actions of the National Foreign Trade Council in its convention in Cleveland, May 4 to 7, in view of the timeliness of the subject and its bearing on automobile importing and exporting. The convention was well attended and had several representatives from the automotive vehicle industry.

A "'Final Declaration," designed to furnish a national program for American foreign trade during the coming year, was drawn up by a representative committee. Gist of declaration follows:

1—Increased imports into the United States.

2—The drawing upon surplus American investment funds in order to furnish long-term credits to foreign buyers.

3—Immediate creation of financial institutions under the Edge Law to extend such long-term credits.

4—Pending the revival of world commerce, the laying up of such of our Government owned Merchant Marine as cannot be chartered on a bare-boat basis or on time charter to private operators.

5—Revision of our shipping laws, which subject American vessels to a competitive disadvantage, estimated at 5 per cent on the capital investment.

6—Uniformity of State laws affecting marine insurance companies.

7—Adequate international machinery for the enforcement of awards of commercial arbitration; and application of standardization to products not already so protected.

8—Adoption of revised and uniform commercial letters of credit and ocean bills of lading.

9—Maintenance of interest in American foreign trade, even though it shows no profit for the moment; and remembrance that in many cases it will cost much more to regain in the future a business lost now through lack of courage and foresight.

10—A bargaining tariff.

11—A reorganization of the foreign service of our Government, which will provide for unified control, and a permanent career to be started at a National Foreign Service Training Academy.

12—The passage of the China Trade Act, which will permit the formation of American companies to trade in China on a plane of tax equality with competitors of other nationalities.

13—The change in our taxation laws which will free Americans living abroad from paying taxes upon income derived from within the foreign country of residence.

14—Adequate support for those departments of the Government which participate in the development of our foreign trade.

15—The revision of our revenue laws necessary to permit the negotiation of a parcel post convention with Cuba.

16—The wider use of foreign trade news by our Press.

17—The expansion of systems of international telegraphic communication under American control and operation.

Big Tire Plant is Model Unit

Production has started in the new eleven-million-dollar plant of the Kelly-Springfield Tire Co., at Cumberland, Md. The factory is noteworthy for the modernness of its equipment.

Every part of the power plant is duplicated throughout, so that there is no fear of holdups in production, due to breakdowns. The machine shop is most up-to-date and conveniently arranged. Through this plant the company will be able to maintain a very much greater production than is possible at present.

Enormous Stocks of Gasoline on Hand at End of April

The stocks of gasoline in the country at the close of April were the largest in the history of the United States, according to the recent report of the United States Bureau of Mines, Dept. of Interior. The figures show 755,000,000 gal., an increase over stocks at the end of March of 42,000,000 gal.

Business depression in all lines, coupled with the high prices which have prevailed for both crude oil and gasoline, in its principal markets, are believed to be the reasons for the enormous increase in stocks on hand.

Consumption of gasoline this year has shown large increases over the corresponding period a year ago. For five months, ended March 31, the average daily use of gasoline, statistics compiled by the Bureau of Mines show, was 11,873,588 gal., an average increase of 25 per cent. If the rate of increase is maintained, the average daily consumption for the next three months will be in excess of 16,321,000 gal.

Cylinder Regrinding Discussed at A. S. A. of N. Y. Meeting

The responsibility of the service station ordering the regrinding of cylinders was dealt with at length by N. W. Durnin, vice-president of the Houpert Machine Co., Long Island City, at the May meeting of the Automotive Service Association, New York. He pointed out that the Heald grinders functioned perfectly but some service managers assumed grinding was the cure-all for engine trouble, which it wasn't. The need of the piston being square with the cylinder and other factors of a similar nature were explained and cases cited to show how some mechanics are negligible. Explanation was made how to measure cylinders, etc. Pistons and rings were also discussed, the speaker stating his company advocated the conventional piston and a snap ring unless otherwise ordered. O. P. Bernhardt, director of service of the Timken-Detroit Axle Co., Detroit, traveled from that city to New York to give an instructive talk on axles, care and maintenance, service, etc. Otto Griesman, one of the live wires of the association, presented it with a very handsome banner.

Dallas Brass Wins Patent Suit

Judge John M. Killits, of the District Court of the United States, for the eastern district of Michigan, southern division, handed down a decree on March 18 completely sustaining patent 1034954, held by the Dallas Brass & Copper Co., on their lock seam tube-forming machine, in their suit against the Motor Products Corporation and Diamond Manufacturing Company, of Detroit.

Tubing made on these machines is principally used in the radiators of automobiles, about 75 per cent of the radiators being made of this type of tubing, according to the manufacturer.

Michigan Trade Association Officially Formed

Michigan, greatest automotive manufacturing state in the union, now has its state automotive trade association. The new organization came into being at a two days' meeting held at Detroit May 10 and 11, after a sound preliminary foundation had been built by organization officers of the National Automobile Dealers' Association. The new state association starts with a pledged membership of nearly 250, and with seventeen local associations affiliated or on the eve of affiliation. What is more to the point, the spirit of those who put the association over is of the type that cannot fail to make the new organization a power in its field. The first officers are:

Guy S. Garber, president of the Garber-Buick Co., of Saginaw, president; Richard Fair, Kalamazoo, vice-president, and Clark Graves, of Lansing, treasurer. The directors are: G. E. Northrupp, Grand Rapids; James Woodward, Battle Creek; J. J. Tompkins, Saginaw; George Simmons, Flint; Gilbert Loomis, Jackson; C. H. Mitchell, Bay City; John Cawood, Port Huron; F. E. Hathaway, Muskegon, and Walter J. Bemb, Detroit.

Mr. Garber, the first president, is also president of the Saginaw Automobile Trade Association and state vice-president for Michigan of the N. A. D. A.

All members of the state association automatically become members of the national association.

The program at the two days' session was exceptionally worth while at this time. Among the speakers were P. E. Chamberlain, Wayne Hearne, Harry G. Moock, Jesse E. Smith and Fred W. A. Vesper, president and past president of the N. A. D. A., respectively; Harry Meixell and S. S. Stratten. Every single talk was constructive and valuable.

On the first evening of the meeting the Detroit Automobile Dealers' Association was host at a banquet served at the Hotel Statler, at which Guy O. Simons, its president, acted as toastmaster. An amusing and very instructive skit on the used car sales problem was given as part of the entertainment. H. H. Shuart, manager of the Detroit dealers' organization, arranged the details.

The 1922 session of the new Michigan association will be held at Grand Rapids.

General Motors Export Elects Directors

At a deferred annual meeting of the stockholders of the General Motors Export Company, directors were elected as follows: Curtis C. Cooper, Paul Fitzpatrick, J. Amory Haskell, Norval A. Hawkins, Alfred P. Sloan, Jr., Peter S. Steenstrup, Alfred H. Swayne. At the subsequent organization meeting of the directors, the following officers were elected: J. Amory Haskell, president; Paul Fitzpatrick, vice-president; Peter S. Steenstrup, vice-president; Alfred H. Swayne, vice-president; Austin S. Murray, treasurer; Thomas S. Merrill, secretary; George H. Bartholomew, assistant secretary.

Windsor White to Retire From Intensive Work in White Company

Directors for the White Motor Co. were recently elected at the annual meeting as follows: E. R. Tinker, of New York; Walter C. Teagle, of New York; Philemon Dickinson, of Philadelphia, and William G. Mather, J. R. Nutt, Warren S. Hayden, Otto Miller, Homer J. Johnson, Albert R. Warner, Windsor T. White, Walter C. White and Thomas H. White, all of Cleveland.

At the organization of the new board, Windsor T. White asked to be relieved of his duties as president, which office he has held since the company was organized, and stated that E. W. Hulet, the second vice-president, and Mr. Warner, the secretary, also desired to retire from active connection with the company. Mr. Hulet has been with the company over twenty years. At the request of the board he has consented to remain in an advisory capacity, so that the benefit of his long years of successful factory management will still be available to the company. Mr. Warner has been with the company for seventeen years and terminated his active connection with it to the regret of the management and the Board of Directors. He remains a member of the board.

Acting upon the requests, as outlined by the president, the directors elected Windsor T. White, chairman of the board; Walter C. White, president; Thomas H. White, vice-president, in charge of production; George H. Kelly, treasurer, and T. R. Dahl, secretary.

The Department of Commerce Issues Automobile Statistics

The rapid expansion of the automobile industry can be fully realized through the census of manufactures, a comparative summary of the United States for 1914 and 1919, issued by the Department of Commerce, Washington.

Industry	No. of Establishments 1919	1914	Value of Products 1919	1914
Automobile bodies and parts	2,394	971	673,590,000	129,601,000
Automobiles	315	300	2,387,833,000	503,230,000
Automobile repairing	15,486	3,273	222,596,000	29,920,000

Yellow Cab is Heavily Insured

A very progressive policy has been adopted by the Yellow Cab Co., of Chicago, in insuring the company for $11,500.000, each of the 1150 cabs having been insured for $10,000. This policy indemnifies its patrons against injury. It has been placed with the Hartford Accident & Indemnity Co., of Hartford.

N. A. C. C. Very Active at Washington

The presentation of a definite highway policy under a Federal Commission and a plan for the revision downward of the taxes and the expenses of the Government were some of the activities of the Taxation Committee of the National Automobile Chamber of Commerce during the month of May.

Speaking before the Senate Committee on Post Offices and Post Roads, George M. Graham, of the N. A. C. C. Highways Committee, outlined a policy for highway unification under a Federal Highway Commission directly responsible to the Chief Executive. This centralization of power will afford greater economy in road expenditures and permit the employment of the ablest brains for the accomplishment of this work.

By selection of roads of primary interstate importance and the concentration of Federal funds in conjunction of State funds on these roads, a great benefit and saving of money will be accomplished for counties, as well as the State. Highway maintenance by the States is an absolute requirement. Mr. Graham further advocated the construction and maintenance of roads through Government forest reservations from Federal funds.

At a later hearing before the Senate Finance Committee, C. C. Hanch, chairman of the Taxation Committee of the N. A. C. C., and Mr. Graham presented recommendations for a reduction of burdensome taxes and greater Governmental economics. In connection with motor vehicle taxation Mr. Graham said: "The heaviest burden of the present tax load is the automobile industry. The motor vehicles not only pay the normal taxes levied on all industries, but also special additional Federal taxes on sales of complete units and parts, as well as special State license and registration fees."

Sharon Pressed Steel Undergoes Reorganization

Harry W. Torney, of Torney & Co., recently made president of the reorganized Sharon Pressed Steel Co., Sharon, Pa., has taken in hand the refinancing of the concern and states that its former financial difficulties have been satisfactorily adjusted. The company is now in a position to handle production and delivery of passenger car and truck frames up to 1500 per day.

Manufacture is now in charge of Arthur W. Swan, general manager, formerly chief engineer and works manager of the Crucible Steel Co., and its associates. The plant has received some additional equipment, which greatly enhances its production possibilities.

Italian Custom Duties Still Required

Of much interest to motor vehicle exporters is the recent announcement that, although import licenses are no longer required on chassis shipped to Italy, the shippers are required to pay custom duties.

Are You Supporting Your Service Association?

(*Continued from page 39*)

While some manufacturers are co-operating with the service associations by sending their service men to address meetings, much remains to be accomplished by the unit and parts makers in the truck field. What is desired by the members—service managers—is a factory man who knows the product from A to Z, and who can describe and illustrate the factory methods of assembly and disassembly of the product. To be made practical it is suggested that a unit be shown and that any special or factory tools be displayed for the benefit of the service managers. Factory men who seek to exploit the product, rather than give service knowledge, are not desired, say the associations. There is no denying the fact that a practical demonstration of the unit will accomplish much to sell the service manager on the manufacturer, which will be his reward for the expense involved. It should not be impractical to arrange a trip for the factory man, for the meetings are so scheduled that there would be little waste time. Moving picture displays of the product always bring out a large attendance and the industrial films are gaining in popularity among the mechanics, which brings up the thought that the day is not far distant when factory methods will be taught the dealers' mechanics on the silver screen.

Side Lights on What the Associations Are Doing and Planning

Baltimore

The Automotive Service Association, of Baltimore, Md., was organized in October, 1920. The annual dues are $10, with no initiation fee. Meetings are held the first Monday of each month. About 75 per cent of the members are passenger car dealers' employes, 15 per cent truck and 10 per cent accessory. No repair shop or garage men are members to date. Seven meetings have been held thus far.

The association appears to be experiencing difficulty in getting the members out to the meetings, to create sufficient interest in the work of the association. The total membership is about 25, and it would appear that there is need for active interest on the part of members to increase the membership. H. S. Small, vice-president, has left the city, and the position of secretary and general manager made vacant by the resignation of John C. O'Brien is being filled by A. L. Thomas.

Brooklyn

The Automotive Service Association, of Brooklyn, celebrated its annual meeting on April 5 and was organized a year ago with 65 charter members. This association is a live one and has grown steadily, having up to the April meeting 170 active members. Meetings are held the second Monday of each month. Dues, $10 a year. This association is unusually successful in bringing out their members to the meetings and at the April event over 50 per cent were in attendance.

During the past year the association was addressed by service experts, engineers, etc., and frequently the subjects were illustrated by moving pictures. Various subjects of interest, such as cylinder grinding, welding, etc., were presented by experts, and visits made to plants. Joint meetings have been held with the New York Association and with the Brooklyn Engineers' Club.

The official organ of the association is the Long Island Autoist, in which is given in advance the events scheduled, as well as the activities of the organization. Meetings are held at 1255 Bedford Avenue, and the association extends a cordial invitation to members of other associations to attend. About 60 per cent of the members are in the passenger car industry, 5 per cent trucks, 15 per cent in equipment and 20 per cent garages and repair shops. It is stated that no difficulty is experienced in securing members and at the present time of writing there are 18 applications to be considered.

No trouble is had in obtaining special speakers, which are confined to automotive service subjects. Much of the success of the association is due to the Social Committee, which arranges a social hour following each meeting and serving refreshments. Dances, stag smokers, bowling, fishing parties, minstrel show, clam bake, ball games, outings, etc., prove strong drawing cards and have been the means of getting the members well acqainted with each other. As the genial secretary, Fred Smith, says, "Can you beat it for $10 a year?" Officers of the association have been active in assisting in organizing similar associations in other cities.

Buffalo

The Automotive Service Association, of Buffalo, was organized in April, 1920, and is under the direction of the parent body, the Buffalo Automobile Dealers' Association. Meetings are scheduled every other Tuesday of the month. The dues are $1 a month. About 80 per cent of the members are identified with the passenger car industry, service managers, 12 per cent are truck service managers and 8 per cent battery, tire, accessory, etc., service managers. No garage or repair shop men are eligible to membership.

It is stated that the association has greatly improved the service emanating from the battery and equipment service stations. The association also has been able to better control the labor situation through co-ordination of the service managers and dealers.

The association reports that no trouble is experienced in obtaining speakers, but it would prefer to have better speakers from the factories, preferably the service managers. Statement is made that better results would be obtained if the service managers, members, were allowed to control the labor situation, not the dealer. The association is not in favor of national meeting or convention of the various associations, as sufficient progress has not been made by the local associations to warrant this step.

Newark

The Automotive Service Association, of Newark, N. J., was organized within a short time after New York initiated the movement. The meeting of organization was held in October, 1919, and was due to the untiring efforts of Al Rawson, who has held the office of president ever since. The meetings are held the second Thursday of each month and 24 have been held to date. The dues are $10 a year for active and associate membership, and $50 for propriety or dealer. The membership is evenly divided, about 30 per cent being connected with the passenger car, 30 with commercial cars, 30 equipment and 10 per cent independent repair shops.

"Our association is trying to make the owner feel that he is well taken care of," said President Rawson. "Our plans for the year are in accordance with the above, and we believe that if we accomplish this purpose we will have done a great deal. The greatest difficulty we experience in obtaining new members is the same as in any other organization. As long as there is something sociable going on it is an easy matter to get the members to turn out, but, if there is any business to be transacted, I have found it always to be the case that there are a few that can be depended upon to help out.

"We are rapidly expanding and expect within a few months that we will have all the trade in Newark. We have had no trouble in securing good speakers on different service subjects. We believe that the most important thing the manufacturer or dealer can do to help our organization is first to wake up to the fact that service is the most important thing in their organization, and, second, to work with us in order to further our work. The manufacturer can assist us by giving us ideas on service on their particular product.

"I am very much in favor of an annual meeting of the associations, the same as held recently in New York (second annual meeting of service associations conducted by New York), providing it is put across properly. But from the way things have taken place in New York I have yet to see

any results that have been obtained from the committee appointed for the work.

"The trade is assisting us to a certain extent and I believe that we can do a great deal more to drive the service proposition home to the manufacturer and dealers. They are the ones, at the present time, that have got to realize the good that can be accomplished by properly conducted service stations.

New York

The Automotive Service Association, of New York, the pioneer in the movement to bring together the service managers of dealers and distributors of automotive equipment, passenger cars and trucks, was formally organized June 23, 1919. It was the outcome of the efforts of Ralph C. Rognon, now president of the association, one of the most active workers in the movement for better mechanics, shop methods and service.

The association has grown rapidly and consistently, having up to the June meeting 275 members, with 10 applications to be acted upon at the June meeting. Up to June the organization has held 156 meetings, also conducted eight social events, such as outings, dances, smokers, etc. It promoted the first annual convention of service associations in January, 1920, and a similar event this January, at which were present delegates from the various service associations and guests in various branches of the industry.

The officers have been very active in assisting other cities to form service associations, among which are Newark, Brooklyn, Hartford, Syracuse, etc., sending speakers and supplying data. The association publishes the A. S. A. Bulletin.

The success of the association is largely due to the untiring efforts of the various committees and officers and to the energetic work of secretary-general manager, Howard Pile, which demonstrates the need of a live-wire secretary if a service association is to be successful. It has been and is the policy to secure the services of speakers on subjects of interest to all members, and during the past year service managers of factories have given their services. At these meetings effort is made to demonstrate any special tool, etc., so that the service men may witness a practical operation of the device.

Through the courtesy of the Automobile Dealers' Association the meetings are held at the rooms of this organization, and the service association welcomes visitors from other cities at its meetings. The association will hold its second annual clam bake at Glenwood-on-the-Sound, L. I., August 21, and an excellent program has been arranged by the committee. The final meeting of the season will be held June 2, and meetings will not be resumed until September 8, which will be a get-together meeting.

The Automotive Service Association, of New York, concluded its meetings on June 2 and sessions will not be resumed until September 8. The final meeting was well attended and was given over to an open discussion of the plans for the coming year. It was the consensus of opinion of the service managers that effort should be made to secure the services of factory service men, particularly the unit makers, and that their talks be confined to the mechanical or service features of the product, not the product. It also developed that factory methods and special tools are what the service men of the association are interested in, and that any factory or parts maker who will supply the right kind of speakers will be more than repaid for his trouble by the good will created among the service managers.

The improvement or development of highly skilled mechanics was again discussed and the advocates of the plan include some of the best informed members of the association. A Technical Committee was appointed, and effort is to be made to educate those shops whose methods are not strictly businesslike to see the error of their ways. A number of new members were elected and an excellent program of entertainment supplied by the Social Committee. The members will meet once this summer, a social event, to be held August 21.

National Motor Maintenance Association

The National Motor Maintenance Association was organized in April, 1920, with officers composed of the Omaha, Neb., Local Motor Maintenance Association, the success of which was instrumental in the forming of the national body. The thought of the organizers was to give other cities the benefits accrued from the first-named association, but an official states that immediately after organizing there followed criticisms of the action by several service associations, particularly the Eastern.

In writing, an officer of the Omaha association says: "The result has been that we did, and quietly, a great deal of preliminary organization work in this section of the country and were prepared to add a number of locals to the National, when the slump came in business last year. We have been marking time since then, but plans are being made to renew the organization work. Our local association has been a great success. The National would have been also, had there been a spirit of co-operation shown by the Eastern interests. And we are not at all sure but what we will make this National Association a success in spite of conditions before we get through."

Syracuse

Meetings of the Automotive Service Association, organized July 1, 1920, are held the second Thursday of the month. Annual dues are $10. About 55 per cent of the members are in the passenger car industry, 5 per cent are truck service managers, 5 per cent independent repair shops and garages and 35 per cent equipment representatives.

The outstanding accomplishment has been the creation of decided improvement in feelings between the various service departments. The association put over the cash service system and it is now almost universal.

While a number of good speakers were secured, the association plans to obtain the services of more factory men and factory executives to address future meetings.

Hartford

The Automotive Service Association, of Hartford, Conn., was formed March 31, 1921, for the promotion of common interests by social intercourse, friendly discussion of methods and co-operative efforts, or by any other just means that will increase the efficiency of the service of Hartford station managers to the public. All individuals and companies conducting garages and repair shops are eligible to membership. Meetings are held the second Tuesday of the month. The Board of Directors, including F. W. Cooke, A. B. Hubbs, L. A. Pierson, C. E. Thorngran, W. O. Kierstead and James W. Mayer, meet at frequent intervals. At a recent meeting the following were appointed an Educational Committee: M. F. Pallotti, chairman; Charles W. Church, C. F. Schrag and J. C. Lavoie. One of the duties of this committee is to arrange for speakers.

National Service Conventions

The first national Service Managers' Convention, comprising passenger car and truck factory service managers, was held at Detroit, November 10-12, inclusive, 1919. The convention was promoted by the National Automobile Chamber of Commerce, and as a result a permanent organization was formed. Conventions are held semi-annually, the second taking place at Indianapolis, May 24-26, 1920. The third was held at Cleveland, November 9-11, 1920, and the fourth at Buffalo, May 17 and 18, this year.

The conventions are restricted to factory representatives, although others identified with service are invited. The various ramifications of service are discussed at the conventions in papers prepared by the members.

The N. A. C. C. publishes a monthly Service Bulletin, which is sent free to members, service associations, dealer associations, automotive schools, etc., and to those individuals to whom its contents may be of benefit. The headquarters are at 366 Madison Ave., New York City, and the Bulletin is edited by Harry Cobleigh, secretary of the Service Committee.

The service department has been very active in promoting service associations in the various cities and extending aid to those contemplating an organization. It supplies complete information as to how to organize, etc., and encourages the factory service managers to co-operate with the local associations. The department in formulating plans to form service associations in all of the principal cities of the country and an energetic campaign will be launched early in the fall. The present Service Committee of the N. A. C. C. is as follows: A. B. Cumner, chairman; L. C. Voyles, F. A. Bonham, F. Van Z. Lane, J. B. Bray, C. R. Lester and F. J. Wells.

"Get the Truck on the Road"

(*Continued from page 37*)

The entire first floor of the main building, except a section skirting the right, employed for the storage of repair parts, is given over to the service station. Sufficient space is afforded in this department for servicing as many as fourteen trucks at one time. The dispatch with which the trucks are completed makes the need of this space unnecessary, despite the fact that more than 800 trucks are serviced here annually.

Special Engine Repair Room

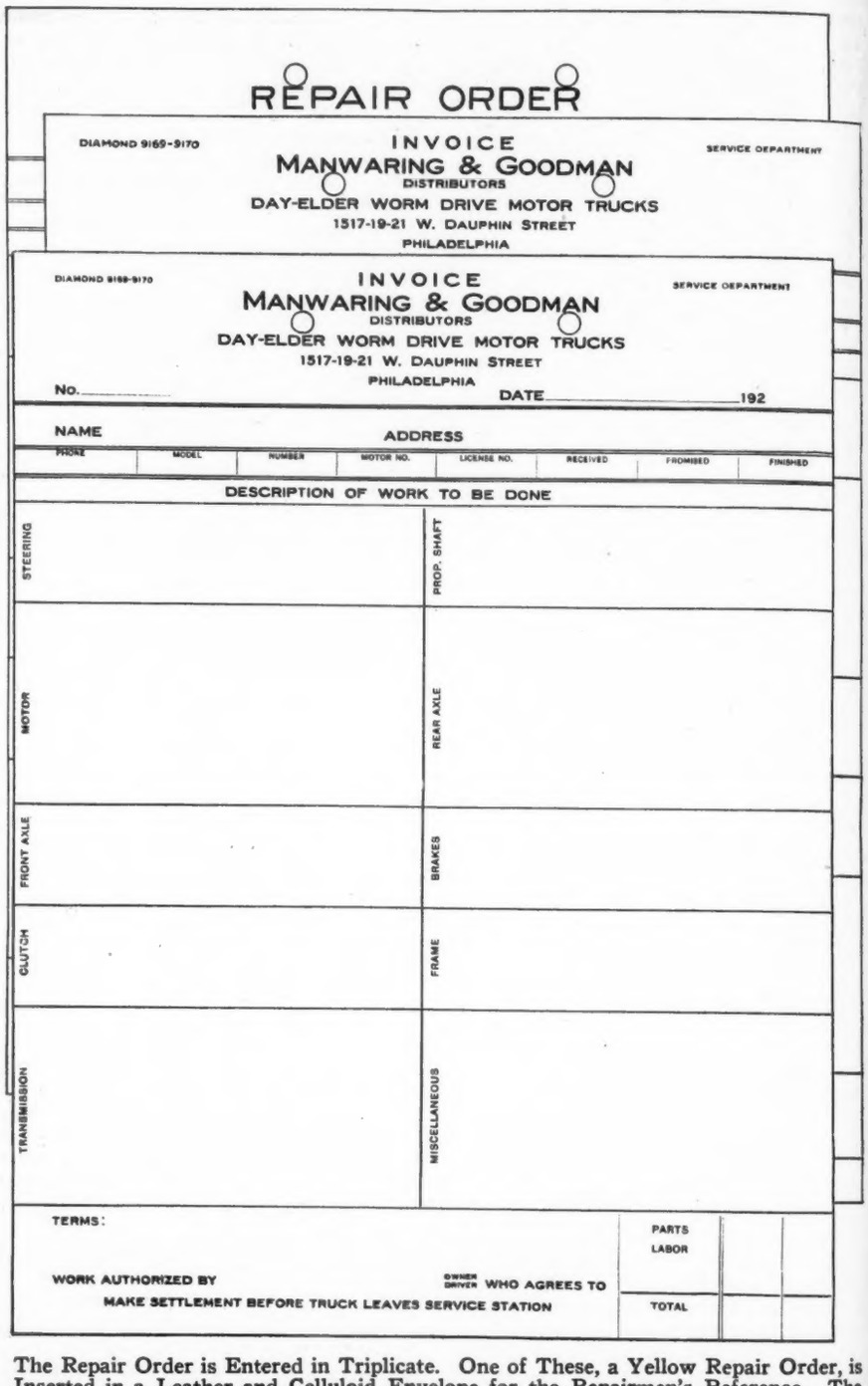
One corner of the first floor is screened off. It covers a floor space of 12 x 18 ft. This compartment is both the tool and engine repair room. The tools, which are obtained by the mechanic through the familiar brass check system, are arranged systematically in bins and racks arranged along the wall side of the room. The big feature of the room, however, is that all engine overhauling jobs are accomplished here by a special engine expert, who works unmolested and has within convenient reach all tools necessary in his work. This room is fully equipped with the exception of a running-in machine and bearing scraping-machine, although the service manager hopes to secure these shortly. He believes that with the addition of these he will be able to turn out an engine job in one-half the time it requires now. He is also a "bug" on accuracy. Any job more than a thousandth of an inch out of true is absolutely not countenanced. When an engine or any repair job is completed in this shop it must be right.

The main part of the floor is provided with motor stands, cranes, heavy duty arbor press, portable electric drills and work benches. If a certain job requires machine work it is taken up to the second floor to a machine-shop equipped with all manner of machines, such as lathes, planers, shapers, automatic drill presses, etc.

Trade-ins Are Completely Overhauled

The third floor is devoted to the overhauling of all Day-Elders taken in as trade-ins. Except for the engine, which is repaired on the first floor in the engine room, all jobs are completely overhauled in this department. This department is divided into two parts, one section for general repairs, and the other for all paint work.

A unique idea of the sales manager was put into operation in this department. It has resulted in the saving of quite a sum of money. All parts in tolerably good condition are salvaged and stored systematically in a small cage furnished with racks and bins. In this way many of the more perfect parts that ordinarily would have been junked are used to profitable advantage. In fact, complete transmission cases have been assembled from these parts.


REPAIR ORDER

DIAMOND 9169-9170 — SERVICE DEPARTMENT

INVOICE

MANWARING & GOODMAN

DISTRIBUTORS

DAY-ELDER WORM DRIVE MOTOR TRUCKS

1517-19-21 W. DAUPHIN STREET

PHILADELPHIA

DIAMOND 9169-9170 — SERVICE DEPARTMENT

INVOICE

MANWARING & GOODMAN

DISTRIBUTORS

DAY-ELDER WORM DRIVE MOTOR TRUCKS

1517-19-21 W. DAUPHIN STREET

PHILADELPHIA

NO._____ DATE_____192

NAME ADDRESS

PHONE | MODEL | NUMBER | MOTOR NO. | LICENSE NO. | RECEIVED | PROMISED | FINISHED

DESCRIPTION OF WORK TO BE DONE

STEERING | PROP. SHAFT

MOTOR | REAR AXLE

FRONT AXLE | BRAKES

CLUTCH | FRAME

TRANSMISSION | MISCELLANEOUS

TERMS:

PARTS

LABOR

TOTAL

WORK AUTHORIZED BY OWNER DRIVER WHO AGREES TO MAKE SETTLEMENT BEFORE TRUCK LEAVES SERVICE STATION

The Repair Order is Entered in Triplicate. One of These, a Yellow Repair Order, is Inserted in a Leather and Celluloid Envelope for the Repairmen's Reference. The Other Two Are Invoices, and Are Kept in Duplicate Until the Job is Completed. Then One is Presented to the Owner as a Bill and the Other Retained for the Office Files.

NAME MATERIAL USED NO.

QUAN. | PARTS | PRICE | AMOUNT | QUAN | PARTS | PRICE | AMOUNT

FORWARD

TOTAL TOTAL

Showing the Reverse Side of an Invoice Sheet. On It is Entered an Itemized List of Material Used

When a trade-in job is completed it not only has the appearance of a new job, but is considered almost as good as new. In fact, the regular Day-Elder guarantee goes with each job.

The recent national freight congestion

meant nothing to Manwaring and Goodman in making immediate deliveries and keeping an up-to-date repair parts stock. Probably one of the considerations that had finally induced this firm to take over the Day-Elder line was because of the proximity of the manufacturer to Philadelphia. All the trucks used by this distributor are run from Newark, N. J., where they are made to Philadelphia, under their own power, and at a cost of $25 to the ultimate owner. This freight charge covers the expense of wage for one mechanic, his meals, gasoline, and oil. No definite time schedule is provided for the trip, the journey being also of the nature of a trial trip. The driver, who is an expert mechanic, is at liberty to use his own discretion in the matter of time in order to make all final adjustments. Replacement stock also is continually replenished by parts brought from Newark in the new trucks.

The advantages made possible by this system of freightage are two-fold. First, the cost is materially reduced, and second, which is an important point in service, lost time is eliminated and dispatch substituted.

In order to maintain an even flow of work in the service station and eliminate unexpected peaks, Manwaring and Goodman recently instituted a monthly inspection plan which is designed to encourage the owner to co-operate with the company to mutual benefit. The inspection days of the various owners are distributed as evenly as possible throughout the month, and inspection is rendered by a special "truck inspector."

Monthly Inspection Plan

The results of all inspections are entered on an operating and maintenance inspection report, a reproduction of which is shown herewith. The lay-out of this sheet is such as to facilitate quick checking-up and ready comprehension as to repairs necessary. All the units or main parts of the chassis is divided into ten groups, which in turn are sub-divided, making in all a listing of 118 parts. The inspection blank is filled out in duplicate, the original being retained in the office files for later reference in case the job of repairing is undertaken, and the carbon copy is forwarded direct to the attention of the owner.

In this way the owner learns whether his truck is in need of repairs and if he had been properly educated, when the truck was first sold him, of the importance of attending to repairs upon the first indication of trouble, he will usually present it for the repairs advised on the inspection blank a few days later.

When the truck is taken in for work as a result of the inspection, the original inspection sheet is resurrected from the office files and the description of work to be done is transferred, together with any additional work advised at the moment in triplicate on a standard repair order sheet. The original and duplicate are white invoice sheets, and always kept together until the job is complete. The triplicate is yellow, and is for the reference of the mechanic handling the job. It is inserted in a leather celluloid-faced envelope and hung on the job to be repaired. Forms of these blanks are shown herewith.

Whenever a part is required by the mechanic, he makes known his need to the parts-clerk in the parts-store-room, presenting at the same time the yellow repair order envelope. The parts-clerk refers to the repair order for the job number and charges the part to this job number on a shop requisition blank. The owner's, the parts-clerk's, and the mechanic's name is entered on this blank. The requisition blank is then forwarded to the attention of the chief of the parts-store-room, who refers to his perpetual inventory file to determine the list price of the part required, which is then entered by an assistant clerk in duplicate on the back side of the invoice, which is devoted entirely to a listing of the materials used. At the same time a balance is struck by the chief in the file, thus keeping up-to-the-minute tabs on the stock on hand.

Itemized Bill Eliminates Complaints

Upon completion of the job the list prices of all parts used in the job are totaled and entered in the proper place on the front side of the invoice, together with the labor, which is obtained from a labor sheet, showing exactly the amount of labor used on the job. The amount of labor-time is secured from the familiar time clock card. When the totals of parts and labor are totaled on the invoice, the duplicate is presented to the owner as an itemized bill and the original filed away. The fact that everything done on the job is in black and white has accomplished much in the way of eliminating former complaints. The owner has a complete check and is satisfied.

Parts Storage Simple and Compact

As may be seen by studying the accompanying lay-out of the parts storage room, lost motion in the operation of this system is almost a minus quantity. Not only does the requisition blank follow a direct, even course from the time it is first started on its course by the mechanics requiring a part until it is ultimately listed on the invoice, but the arrangement of the bins and racks is such as to enable the parts clerk to quickly put his hands on any part required. Excessive to and fro traveling is avoided because of the compact bin arrangement and the systematical arrangement of the parts in the bins. For example, all parts of the transmission are to be found in one section, unless the part is very large, such as a bell housing, which is stored in the rear. This method of arrangement has been followed throughout.

OPERATING AND MAINTENANCE INSPECTION REPORT

MANWARING & GOODMAN
DISTRIBUTORS
DAY-ELDER WORM DRIVE MOTOR TRUCKS
1517-19-21 W. DAUPHIN STREET
PHILADELPHIA

NAME MODEL NO. DATE

ADDRESS MOTOR NO. LICENSE NO.

CUSTOMER'S REPORT

STEERING ASSEM.	1	COLUMN ASSEMBLY	FRONT AXLE	41	AXLE	REAR AXLE	81 WORM BEARINGS
	2	DROP ARM		42	KNUCKLES		82 DIFFERENTIAL CARRIER SCREWS
	3	DRAG LINK		43	KNUCKLE PINS		83 AXLE BEARINGS
	4	STEERING ARMS		44	KNUCKLE PIN BUSHINGS		84 AXLE BEARING FELT WASHERS
	5	TIE ROD		45	WHEELS		85 OIL LEVEL
	6	TIE ROD YOKES		46	WHEEL BEARINGS		86 WHEELS
	7	TIE ROD YOKE BOLTS		47	SPRINGS AND CLIPS		87 WHEEL NUTS
	8	TIE ROD BOLT BUSHINGS		48	SPRING BOLTS		88 SPRINGS AND CLIPS
	9	LUBRICATION		49	GREASE CUPS		89 SPRING BOLTS
	10			50	LUBRICATION		90 LUBRICATION
	11			51			91
MOTOR	12	RADIATOR		52			92
	13	RADIATOR CONNECTIONS	CLUTCH	53	PEDAL CLEARANCE	BRAKES	93 LININGS - HAND
	14	RADIATOR HOSE		54	SPRINGS		94 LININGS - FOOT
	15	CYLINDER		55	LININGS		95 LEVERS
	16	CYLINDER HEAD GASKET		56	RELEASE BEARING		96 PULL RODS
	17	CYLINDER COVER GASKET		57	PEDAL SHAFT LUBRICATION		97 YOKES AND PINS
	18	COMPRESSION		58			98 CROSS SHAFTS
	19	CARBON		59			99 LUBRICATION
	20	VALVE ADJUSTMENTS	TRANSMISSION	60	GEARS		100
	21	BEARINGS - ROD - MAIN		61	INTERLOCKS		101
	22	TIMING GEARS		62	BEARINGS	FRAME	102 SPRING BRACKETS - FRONT
	23	CRANK CASE		63	SLIDING SHAFT		103 SPRING BRACKETS - REAR
	24	OIL PUMP		64	CLUTCH SHAFT		104 REAR SPRING BAR
	25	OIL GAUGE		65	COVER SCREWS		105
	26	OIL LINES		66	OIL LEVEL		106 FENDERS
	27	OIL LEVEL		67			107 FENDER BRACKETS
	28	WATER PUMP		68			108 STEPS
	29	FAN ASSEMBLY	PROPELLER SHAFT	69	SHAFT - FRONT		109 STEP BRACKETS
	30	FAN BELT		70	UNIVERSAL JOINT - FRONT	MISCELLANEOUS	110 OIL LAMPS DASH - REAR
	31	MAGNETO		71	HANGER BEARING		111 HEAD LAMPS
	32	SPARK PLUGS		72	HANGER BEARING BRACKET		112 TUBING
	33	SPARK CABLES		73	HANGER BEARING BRACKET BOLTS		113 TANK AND BRACKET
	34	CARBURETOR		74	UNIVERSAL JOINT - CENTER		114 CAB AND SEAT
	35	GOVERNOR - SPEED		75	SHAFT - REAR		115 HOOD
	36	THROTTLE AND SPARK CONTROL		76	UNIVERSAL JOINT - REAR		116 RADIATOR GUARD - BUMPER
	37	MUFFLER AND TUBING		77	UNIVERSAL JOINT LUBRICATION		117 TIRES - FRONT
	38	GASOLINE TANK		78			118 TIRES - REAR
	39	GASOLINE LINE CONNECTION		79			119
	40			80			120

X REQUIRES IMMEDIATE ATTENTION AND TRUCK SHOULD BE REMOVED FROM SERVICE AND REPAIRED
✓ REQUIRES YOUR EARLY ATTENTION. O TAKEN CARE OF BY INSPECTOR.
IF NO NOTATION IS MADE ITEM IS O.K. WHICH DOES NOT NECESSARILY MEAN PERFECT CONDITION BUT SERVICEABLE.

REMARKS

INSPECTOR

The Special Itemized Operating and Maintenance Inspection Report Used by This Company. The Checking System Employed in Addition to the Remarks Quickly Shows the Condition of the Truck Inspected

Here Are a Few Things for the Manufacturer to Consider

By A. V. COMINGS

FROM the standpoint of dealer service covering the motor trucks he has sold in his territory, the motor truck manufacturer owes the dealer just this:

> **A willing and eager co-operation in every endeavor that will enable the dealer to keep his customers' motor trucks running at a minimum of operating expense, with a fair profit to the dealer for this service and a small profit to the manufacturer for his part in it.**

An honest maintenance of this principle means economical transportation to the users of his truck, which should be the highest aim of every manufacturer; it means **service at a profit** to the dealer rather than a service department with a monthly deficit; it means a service department **that is a sales asset** rather than **a hindrance**; it means a successful, prosperous dealer **doing his part** to make a successful, prosperous manufacturer.

That the manufacturer **has not met his whole obligation** to his dealers in the matter of service co-operation is attested by the numerous failures among retail truck dealers, due primarily to their inability to properly service the trucks they have sold. This inability has been the result of both ignorance on the part of the dealer and a lack of willingness on the part of the manufacturer to help the dealer along the right path. In many cases the factory has not realized the importance of co-operating with the dealer in bettering his service work. The events of the past few months, however, have stirred manufacturers to a realization of many things they gave only passing notice during the rush days, and there is already a very decided change in the attitude of the manufacturer toward his dealer organization.

Service Departments?

In calling upon motor truck dealers in hundreds of cities all over this country I have found that in many cases lack of proper service facilities is the result of a lack of understanding of what real service means, rather than a lack of desire to give good service. I have had many dealers say to me: "Oh, yes, I have a good service department," and when I have visited their "good service department" I have found it to consist of a small, dirty shop, with little, if any, real shop equipment, no facilities for doing repair work efficiently, which means at a minimum of cost to the truck owner, and with a "stock" of parts consisting of what might be taken for a pile of junk, over in one corner of the place.

Is the truck manufacturer interested in bettering this kind of condition, which exists in almost every city in the land? I'll say he ought to be if he isn't.

The truck manufacturer who means to be successful in the future owes it to his dealers to give them the benefit of every possible educational help that will enable them to better their service. If the backward dealer has not yet awakened to the necessity of bettering his service, it is the bounden duty of the manufacturer to arouse the flame of desire for better things in the breast of that dealer—or get rid of him before he can further harm the good name of that truck in his territory. This is no time to temporize with any man in any sales organization in the automotive industry. The man who expects to succeed must be willing to work harder than he has ever worked before. And this work must not be confined merely to sales and business effort; it must extend also to mental effort, to learning more about the way to conduct his business.

Up to the Manufacturer

And it is the duty of the manufacturer to supply the dealer with every possible aid in securing this education. No dealer can afford the time or the money to search out the necessary educational material. But the manufacturer can well afford to devise the very best educational helps to be found and pass them on to his dealers and insist upon their use.

Take the matter of tools in the service shop, for instance. A truck manufacturer knows, or should know, exactly what tools are necessary to properly service his make of truck. He knows just what operations will be necessary during the course of a year's service work, for instance. And it is the duty of the manufacturer to insist that his service stations shall be properly equipped with these tools to do this work, that the work may be done at the least possible cost to the truck owner. The truck dealer has no right to make an owner pay $20 for work done in his poorly equipped shop that would cost but $10 to perform if his shop was properly equipped. Yet this is being done every day.

It is economically wrong, and the sooner the manufacturer, through proper education and proper insistence, remedies this sort of condition, the sooner the motor truck business will begin to improve.

Another thing the factory should do. During the course of servicing a particular make of truck there will be evolved, in the many service stations over the country, special tools for doing various operations quicker and easier, and hence at less expense. There are always clever mechanics who figure out short cuts on work they are constantly handling, and I believe that a factory can save its service stations and therefore its truck users many thousands of dollars a year in the aggregate by acting as a clearing house for the dissemination of knowledge on special tools, short cuts, etc., evolved in the various stations in its dealer organization. A monthly prize, for instance, offered to the mechanic who brings out the best short cut method or the best time-saving tool during the month would stimulate this desire for cutting costs and the company could spread this information broadcast in the shops of its dealers.

I have found this true, that in the hundreds of service stations for both trucks and passenger cars that I have visited all over this country, the ones that were paying a profit to their owners used the greatest variety of clever short cuts and special tools in their work. It seems absurd to have to urge the use of better methods, but it is a sad commentary on the intelligence of this industry, to constantly see obsolete methods in use, to see mechanics working slowly with an "S" wrench where a socket wrench would cut the time in half; to see jacks used where a chain block and trolley would cut costs to a minimum.

Service education conducted by the manufacturer can eliminate many of these evils. I believe the manufacturer will find this an absolute essential in the future conduct of his business.

Supplying Parts Promptly

In the matter of supplying parts to his service stations, two essentials stand out above all others. The manufacturer must be able to ship his dealers the parts they need on the day the order is received. And these parts must be so priced that the dealer may furnish them to the truck owner at a fair price, and yet make a fair profit on them himself. The exorbitant price charged by some manufacturers for the parts they furnish their dealers for servicing their trucks has made a nice profit for the manufacturers in the past, it is true, but it has also made it hard for truck owners to get economical transportation out of their trucks.

That the day of closer factory-dealer co-operation is at hand is attested by many signs these days, and it is not too much to expect that the future of the motor truck industry will see a great advance in merchandising and servicing methods, due in great measure to the educational work that the factories will carry on in the next few years. It is one of the most hopeful indications of the future prosperity of the industry.

Motor Paper is Now Good in Kansas City

OF much more than usual interest to the motor vehicle industry was the visit on May 21 to Kansas City, of Governor Harding, of the Federal Reserve Board, of Washington, D. C., his conferences with the dealers during the day, and the banquet given in his honor at the Hotel Muehlebach in the evening. Besides the morning and afternoon conferences with the motor men, and the luncheon at the City Club, he found time for conferences also with bankers representing member banks from over the Tenth Federal Reserve District during the day.

At the banquet, which was attended by 350 passenger car, truck and tractor dealers and bankers of the Tenth Federal Reserve District, E. E. Peake, secretary of the Kansas City Dealers' Association, called the meeting to order and made a capable address. At its close he called on John Butler, president of the association, to act as toastmaster. Following his words of welcome, and the introduction of special guests from out the city, including the Governors and chairmen of the Federal Reserve Banks at Minneapolis and San Francisco, he called upon Governor J. Z. Miller, of the Tenth Federal Reserve District, for remarks. While his address was brief, it was very much to the point and was enthusiastically received. He said:

"The Tenth District was not exempt from the national joyride, beginning in October, 1919. It was called upon to distribute credit equal to its entire lending power. By April, 1920, it had rediscounted and borrowed ten million, which sum was later increased to $35,000,000 from other districts. Lending by this bank had to stop, that our credit be conserved. It was necessary to scrutinize all paper offered for rediscount. Every class was scrutinized. It is true that in accordance with our responsibility to the general agricultural situation we felt that we should accept the most essential paper. The impression prevailed that the Federal Reserve banks had declared automobile paper non-essential. We never suggested to a member bank that it should not freely lend to dealers. We did say to banks: 'You have ample loans on agriculture and livestock to take up your limits, and we prefer that you send us that and keep the other loans in your portfolio.' Twelve or fifteen per cent is the usual proportion of a bank's portfolio for rediscount with the Federal Reserve Bank. There is ample room in a bank's portfolio for all the automobile paper it might wish to take.

"The year 1920 was a hard one, with the reserve close to the irreducible minimum. We had a liability to those member banks which had not used our facilities, of sixty million dollars. Our responsibility to the district was for the best good of all, including yourselves. If we hadn't acted in the way we did act, you would not be selling cars now. But the corner seems to have been turned. We can see it more clearly today than we could thirty days ago. If nothing extraordinary happens in the next week or so, we can congratulate ourselves that we are fast getting back to normal. And there will be no more scrutiny of paper other than for solvency and desirability."

Governor Harding, following, said that as the guests had heard the thing they most wished to hear, there was not much left for him to say, but, being there, he would study with them the financial history of the past few years.

He met the criticism made by some that the Federal Reserve Bank was profiteering, by showing that the profits accruing were not merely from the capital stock of the system, but that instead of having that fifty million dollars, there were more than five billion dollars used by the system from which profits accrued.

"We are beginning to take high class, that is, solvent, liquid and otherwise eligible motor car paper," says the Kansas City Federal Reserve Bank.

"In order to show you the disposition of the Federal Reserve Banks to the farmer, I shall state some figures very briefly. Although the reduction in the loans of the Federal Reserve Banks since November has been more than a billion dollars, there has been no corresponding reduction, nor any reduction at all, in the agricultural and livestock paper, so far as we can identify. On the 30th of last month the twelve Federal Reserve Banks combined held two hundred and thirty million dollars of such paper; a year before, one hundred and six millions, and in April, 1919, only sixty-six millions. On April 30, of this year, the Federal Reserve Bank, of St. Louis, had nearly four times as much livestock and agricultural paper on hand as it had a year before, and eighteen times as much as it had in 1919. The figures for the Federal Reserve Bank in Kansas City, while they do not show any very material increase in their agricultural and livestock paper, are significant because they are very large figures, and in spite of great reductions in their general loans, say, of 50 per cent, are about the same for the two years: April 30, 1921, showing $35,800,000 as against $35,400,000."

Declaring that through the assistance of the Federal Reserve System the danger of a panic had been averted, and that now the time had come for a forward move all along the line, he predicted the healthy and profitable resumption of business. He declared himself to be an optimist—a believer in constructive optimism, but warned his hearers that the business of the future could not be that of a profiteering boom.

"Whenever," he said, "we get back to doing business on a small margin of profits, frequent turn-overs, business being conducted on replacement costs, then we will see this revival of business we are all anxious to see."

During the week or so following the banquet it was evident that nothing "extraordinary" has happened in the financial world to prevent us from turning the corner, for on the morning of the 28th Governor Miller made specific announcement that the plans had worked out which now justify the Federal Reserve Bank to accept automotive paper for rediscounting automotive paper on the same basis that other paper was received.

This action is taken in view of the fact that the improvement in conditions continue, and that the co-operation of member banks and dealers make it safe to take the steps.

Altogether, the announcement of Governor Miller regarding rediscounting automotive paper is merely the keynote of the portrayal of conditions fast improving. The automotive manufacturers and distributors may fairly interpret his remarks as suggesting that many lines of business, inactive a year or so ago, may now find easier financial facilities, and so expand. While the movement of crops will command a large part of the resources of the banks during the next few weeks, it was more than intimated that the legitimate business of all branches would be cared for, and that there would be abundant money available to finance a very large business in automotive products in the late summer and fall.

A. D. A., of N. Y., Sends Condolences on Mr. Batchelder's Death

The regular meeting of the Board of Directors of the Automobile Dealers' Association, of New York, was held June 1st, and on motion duly made and seconded, it was unanimously carried that the board extend their sincere sympathy to the family of the late A. G. Batchelder. The meeting was adjourned in due respects to the great loss occasioned by the death of Mr. Batchelder.

Tom Moore, executive secretary of the association, left for Washington to place a wreath on the grave of Mr. Batchelder to show the esteem of the association.

Personal Items

O. C. Berry, formerly Professor of Automotive Engineering at Purdue University and Research Engineer for the Hupp Motor Car Corp., has been made chief engineer of the Wheeler-Schebler Carburetor Co., of Indianapolis, Ind.

E. A. Blake is the new service engineer of the Transport Truck Co., Mount Pleasant, Mich. For the past 2½ years he has been in the Experimental Division of the Transport Co. He has also been with the Republic Co., the Curtis Aeroplane Co., the Maxwell and the Standard companies.

J. A. Callahan, vice-president in charge of production, was elected vice-president and general manager of the Martin-Parry Corp., York, Pa., and Indianapolis, Ind.

O. R. Cook, for 26 years prominent in the rubber industry, in both the B. F. Goodrich Co., and the Kelly-Springfield Co., is now affiliated with the Howe Rubber Corp., New Brunswick, N. J., in the capacity of vice-president.

H. H. Crawford, of Detroit, has been announced as special representative for the Gier Tuarc Steel Disc Wheel made by the Motor Wheel Corp., of Lansing, Mich. His territory will include Michigan, Illinois, Indiana, Wisconsin and Ohio.

J. O. Eaton has presented his resignation as one of the receivers of the Standard Parts Co., Cleveland. Frank A. Scott continues as sole receiver.

Homer J. Forsythe, manager of the construction division of the Engineering Dept. of the E. I. duPont de Nemours & Co., Inc., has been transferred to the position of assistant general manager of the Hyatt Roller Bearing Co., of Newark, N. J. He has been in the duPont Engineering Dept. since 1906.

H. E. Fredricksen, well known Omaha dealer, has been elected president, general manager and director of the Hawkeye Truck Co., of Sioux City.

D. R. Geddes has resigned as territory man for Knight Motors, Inc., and has joined the R. & V. Motor Co., as traveling representative for Michigan.

C. F. Hockley, president of the American Hammered Piston Ring Co., Baltimore, Md., recently made a trip to the Pacific Coast, visiting the various distributors of the company's products. The firm reports shipments of large quantities of piston rings to the coast via the Panama Canal.

Roy F. Irwin has resigned from the staff of the Evans-Ayers Co., to assume the post of advertising manager of the Motor Wheel Corp., Lansing, Mich.

Charles F. U. Kelly, of New York, will reenter the rubber industry, after a much needed rest enforced by poor health, as director of sales of the Quaker City Rubber Co., Philadelphia, Pa.

J. N. LaBelle will guide the new Kansas City branch established by the Black & Decker Mfg. Co., Towson Heights, Baltimore, which will include the territory of Kansas, Nebraska, Oklahoma, Texas, Arkansas, western Louisiana and western Missouri.

O. N. McCool, who was formerly sales manager of the Commonwealth Motors Co., Chicago, Ill., has joined forces with the Seneca Motor Car Co., Fostoria, O., as western representative.

Hays McFarland, a well known trade journal and magazine man, has been appointed sales manager of the Bassick Manufacturing Co., of Chicago, Ill.

Warren D. Oakes, president of the Oakes Co., Indianapolis, sailed for Europe, June 1, for a business visit in the interest of the firm, to Belgium, Scotland, England and France.

Tom O'Brien, formerly of the Sales Promotion Department of the Olds Motor Works, Lansing, Mich., has been promoted to the position of assistant sales manager. He succeeds Guy Peasley, who has been advanced to sales manager. Mr. O'Brien is responsible for much of the success of the Oldsmobile Economy truck.

D. C. Paul, formerly of Gaul, Derr & Shearer Co., Philadelphia, will represent the Pittsburg district for the Black & Decker Mfg. Co., maintaining offices at 303 Penn Ave.

H. L. Rackliff, who has been acting as sales manager of the United Automotive Co., Cleveland, O., has tendered his resignation.

M. F. Rumery has joined the sales force of the Denby Motor Truck Co., of Detroit, as district manager of the southern territory, including Kentucky, Tennessee, Mississippi, Alabama and Georgia.

Andrew Scharff has been announced as district manager of the northwest territory of the Multibestos Co., Walpole, Mass., maker of Multibestos brake linings and clutch linings. His headquarters will be at Minneapolis, Minn.

Charles E. Speaks, a veteran of the World War, in which he served as colonel, has been made European manager for the Firestone Tire & Rubber Co., with headquarters in London. Before the war Mr. Speaks was manager of tire sales for the company.

Ralph J. Staehli was recently elected secretary of the Portland Automobile Dealers' Association. He succeeds M. O. Wilkins, resigned.

R. C. Reichel, who has been in charge of factory service for the Chalmers, has been appointed service manager for both the Maxwell and the Chalmers, a position which he is well fitted by reason of his long experience in the service field.

Hal E. Taylor, who was formerly with the Gemco Mfg. Co., is now acting as sales manager of the Las-Stik Patch Mfg. Co., Hamilton, O.

N. H. Van Sicklen, former head of the Van Sicklen Speedometer Mfg. Co., has been elected president of the Reliance Wheel Co., Youngstown, O.

Campbell Ward, well known in the Southern automotive trade, has joined the sales force of the Klaxon Company, of New Jersey. He will spend most of his time in Texas.

Cecil B. Warner, at one time with the Nelson Motor Truck Co., and the Gramm-Bernstein Motor Truck Co., is announced as western manager of the Indiana Truck Corp. He has offices in San Francisco.

O. L. Weaver has tendered his resignation from the Star Rubber Co., Akron, O., as sales manager, on account of ill health. He has been with the company since its organization. A. G. Partridge, vice-president and general sales manager of the Firestone Tire & Rubber Co., will succeed him.

F. R. Wilhelmy, well known throughout the industry as being associated with the Standard Parts Co., Cleveland, O., has been appointed assistant treasurer of the Cleveland Tanning Co., prominent tanners of Cleveland, O.

Harrie R. Williams, director of sales and advertising for the Milwaukee Auto & Engine Supply Co., manufacturer of Milwaukee Timers and Guardian bumpers, has resigned. He has not announced his future plans.

Homer K. York has been appointed assistant secretary and treasurer of the Indiana Truck Corp., of Marion, Ind. For the past four years he has been supervisor of production and service.

Removals and Trade Changes

The Laminated Shim Co. has moved to its new plant and offices at 14th St. and Governor Place, Long Island City, N. Y.

Bremer & Terris Manufacturing Co., 540 West Jackson Blvd., Chicago, manufacturer of body hardware, is now located in its new three-story plant at 137 South Albany Ave.

The Minneapolis Steel and Manufacturing Co. has transferred its New York offices from the Tribune Bldg. to Suite 2908 Woolworth Bldg. The main export offices will hereafter be located at the factories at Minneapolis.

D. Henry Bonner

Formerly of the Ford Motor Co., who is the new sales manager of the Four-Wheel-Drive Auto Co., of Clintonville, Wis.

Harry E. Geib

Who, because of his efficient service, has been made manager of the offices of A. Schrader's Son, Inc., Brooklyn, N. Y.

J. B. Sopher

He recently joined the Division Sales Managers' force of Selden Truck Corp., Rochester, N. Y. Office at Pittsburgh, Pa.

Orville D. Coppock

Who has been promoted from assistant sales manager to sales manager of the Commerce Motor Car Co., of Detroit, Mich.

The Western Radiator Corp., recently formed, has absorbed the Hoover Radiator Co., and the B. & W. Manufacturing Co, both of Chicago, Ill. A plant will be maintained at 410 N. Western Ave., which will make a production of 2000 radiators a day possible.

The Carolinas Nash Motors Co., Charlotte, N. C., distributor of Nash cars and trucks, has moved into its new quarters at North Tryon and 8th Sts. The new building is 50 x 150, three stories, brick and concrete.

The International Motor Co., New York City, manufacturer of Mack trucks, has installed new quarters in the Cunard Bldg., 25 Broadway, having leased the twentieth floor. Service and engineering departments will remain at 64th and West End Ave.

New Agencies

The Linn Motor Co., Port Arthur, Tex., has succeeded the Baker Motor Co., as dealer for Ford passenger cars, trucks and Fordson tractors. L. E. Bailey is manager.

The Federal Motor Truck Co., of Detroit, has opened a parts and service station at 56 Illinois St., West, Chicago, under the direction of the Thomas T. Hoskins Co.

The Vacuum Oil Co., 61 Broadway, N. Y., has opened two new branch offices for its Gargoyle products at Buffalo and Dallas, Tex.

The Southern Motors Manufacturing Association, Ltd., Houston, Tex., has opened its first branch office in South Carolina at Columbia. G. E. Shipley is office manager.

The Clark-Turner Piston Co., of Los Angeles, announces the appointment of Harkness-Hillier, Ltd., Sydney, Australia, as distributors for Australia of De Luxe pistons.

The Rainier Motor Corp., of Flushing, L. I., will open a factory branch at 985 Broad St., Philadelphia, Pa., where a modern show room and service station is to be erected.

The Zinke Co., 1323 Michigan Blvd., Chicago, Ill., is now acting as the sales department for the Vogt Mfg. Corp., of Rochester, N. Y., on its Viking brake and transmission lining for Fords.

New Incorporations

The Bedford Auto Rim Co., Inc., Brooklyn, N. Y., has been incorporated at $100,000 to deal in tires and rims.

The Bear Cat Battery Co. has been organized at Peoria, Ill., and articles of incorporation issued. The capital stock is $15,000.

The Lansing Bus Co. has been organized in Lansing, Mich., as state distributor for special bodies for all makes of truck chassis. Fred L. Waite, who is financially interested in the new company, will manage the business.

The Niles Motor Truck Co. has been chartered at Wilmington, Del., to manufacture and sell automobiles and parts for same. The capitalization is $1,000,000.

Literature

Paul G. Niehoff & Co., Inc., 232 East Ohio St., Chicago, has issued an exceptionally interesting and attractive catalog of its products. The volume shows clearly the extensiveness of the company and its products.

The Ambu Engineering Institute, Chicago, Ill., is now putting out a home study course in Automotive Electricity to include the following subjects: Fundamental Electricity, Ignition, Starting and Lighting, and Storage Batteries. Simplicity and thoroughness characterize the course. Full details from the Institute on request.

J. H. Newmark, advertising manager of the Chevrolet Motor Car Co., has just completed a course in automobile salesmanship in 20 booklets. There are eight exceptionally good volumes on the motor truck, practical and interesting. Published by Leslie-Donald Co., 15 West 37th St., New York City.

The Haynes Stellite Co., 30 East 42nd St., New York City, has published two useful booklets on its product, Stellite, called "Stellite Bar Stock" and "Stellite Welded-Tip Tools." These books contain some valuable information on the application of tools and will be an asset to the shop superintendent and machinist.

Factory News and Capital Increases

The Marion Tire and Rubber Co., Marion, O., has increased its capital stock from $750,000 to $1,250,000.

The Queens Boxing Corp., 801 Vernon Ave., Long Island City, announces that it is in a position to handle all types of boxing for passenger cars, trucks and tractors for export in a painstaking and reliable manner.

The Collapsible Rim Manufacturing Co., of Asheville, N. C., announces that it will construct a factory and rolling mill in Louisville, Ky. The firm has a capitalization of $2,000,000.

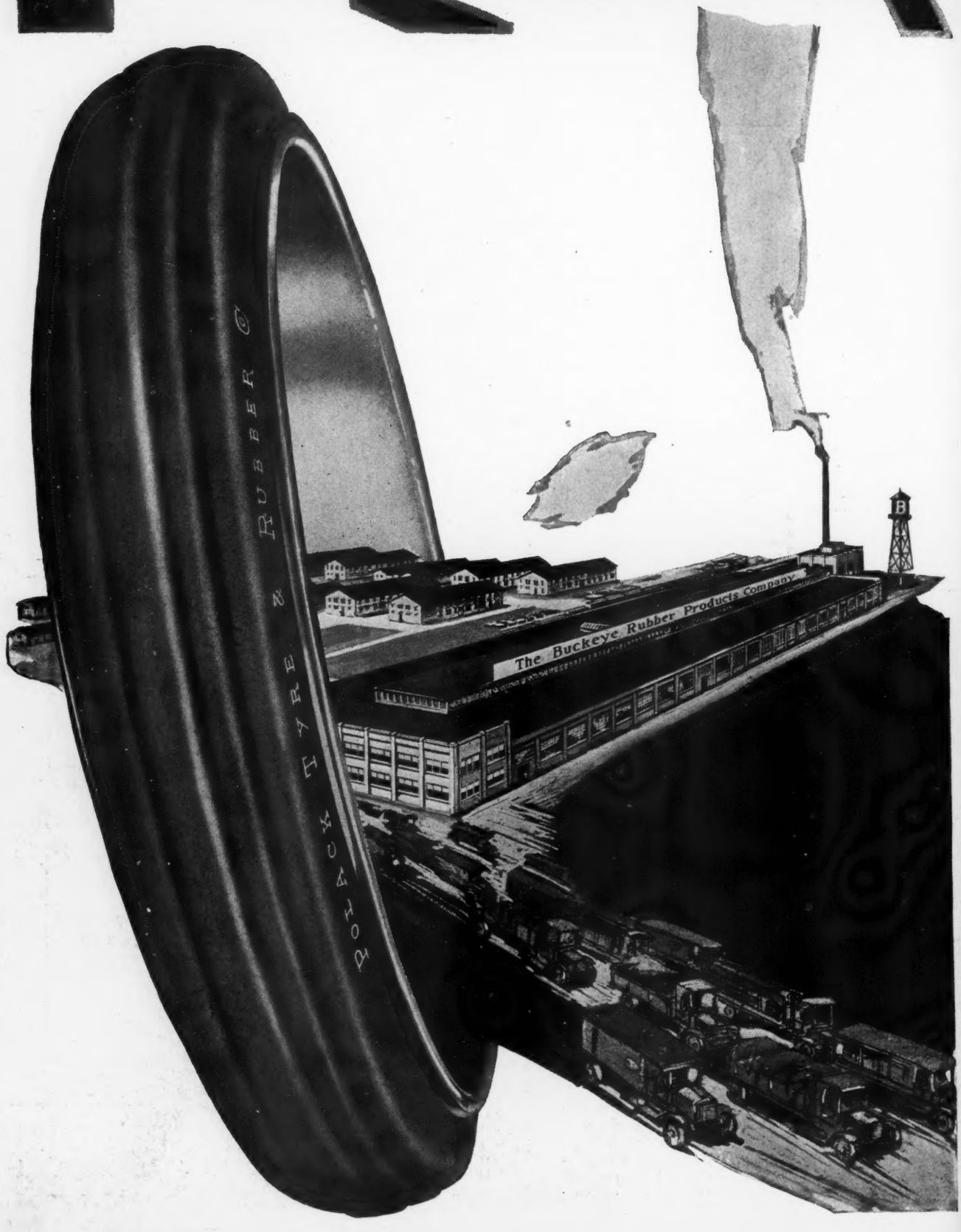
The Paul Rubber Co., Salisbury, N. C., is erecting a large plant for tire manufacturing to afford 25,000 ft. of floor space. The firm is contemplating an output of 500 tires and 1000 tubes daily.

The Clark-Turner Piston Co., of Los Angeles, report an extensive expansion in its plant facilities. The additions to the factory were made without an arrest in production. Much new machinery has been installed, which will greatly increase the piston output.

Spirit of Transportation Parade Held in Los Angeles Recently

Photographs taken by Ezra W. Clark, of the Clark Equipment Co., on his recent tour through the West in the interest of better conditions throughout the automobile industry. The parade was staged by the Motor Car Dealers' Association of Los Angeles on May 14, which was officially designated by Governor Stephens of California as Automobile Day. Credit for this event's success was largely due to Burt Roberts, secretary of the above named association. The vehicles in the procession depicted the evolution of transportation in America and included the early Indian travois, the ox team, the prairie schooner, the stage coaches and the various motor vehicles since 1850.

POLACK



THE COMMERCIAL CAR JOURNAL

Entered as second-class matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879

Vol. XXI PHILADELPHIA, JULY 15, 1921 No. 5

Published the 15th of each month by the

CHILTON COMPANY

Market and 49th Streets Philadelphia, U.S.A.

JAMES ARTMAN, President C. A. MUSSELMAN, Treas. & Gen'l Mgr.
GEO. H. BUZBY, Vice President A. H. VAUX, Secretary

ADVERTISING DEPARTMENT

C. MONROE SMITH, Eastern Manager GEORGE H. DUCK, Western Manager
GEORGE D. ROBERTS, Advertising Director Chilton Publications
A. W. BROWNELL, Advertising Manager
L. E McCONNELL, Jr., New York E. H. CROLL, New York
F. W. HENKEL, Chicago
J. C. WEED, Detroit E. W. CORMAN, Cleveland

EDITORIAL DEPARTMENT

JAMES ARTMAN, Editor in Chief ALBERT G. METZ, Managing Editor
MARTIN J. KOITZSCH, Associate Editor

EDITORIAL REPRESENTATIVES

C. P. SHATTUCK, Field Editor A. V. COMINGS, Western
CHESTER S. RICKER, Technical

TABLE OF CONTENTS

	PAGE
Advertisers' Index	199
Buyers' Index of Reading and Advertising Pages	195
Commercial Car Specifications	55
Editorials	23
Equipment and Appliances	70
Metal and Rubber Markets	80
New Commercial Cars	30
News of the Trade, Including Personals, New Agencies, Factory Items, Etc.	24
Pneumatic Tire Prices	68
Replacement Table	49
Service Station and Repair Shop Appliances	47

SPECIAL ARTICLES

Price Reductions	13
Opportunities for Truck Sales	15
$1,250,000,000 for Road Building	17
A Prominent Distributor Tells How the Truck Manufacturer Can Help the Dealer	19
Cashing-in on Trailer Sales	20
Care and Storage of Wood Wheels for Motor Trucks	34
The Motor Truck as an Aid in Fighting the Gypsy Moth	36
Are You Giving the Truck a Thorough Inspection Instead of the "Once Over"?	37
Some Reasons Why You Must Analyze Your Territory and Your Sales	40
Our London Letter	42
Why is This Concern a Success?	43
Concrete Roads Lower Hauling Costs for Grain and Feed	44
Tractor and Truck Take Place of Fifty Mules	45
How a Thoroughly Motorized Department Store Cares for Its Transportation Equipment	73
Has Your Motor Truck Been Prepared for Summer?	75
Special Portion Body for Road Building Work	77
Wire Reinforcement Produces Stronger Highway	78

SUBSCRIPTION RATES

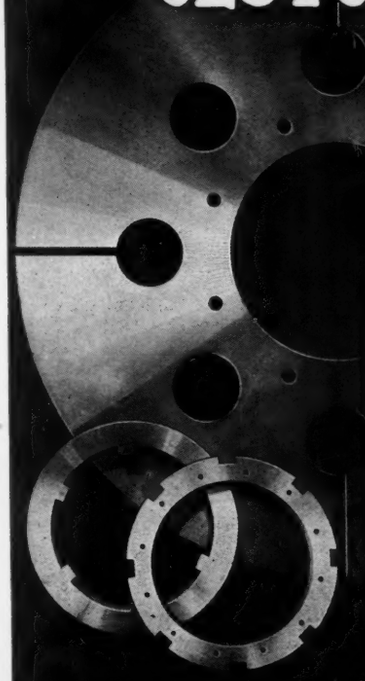
United States and Possessions	$2.00
Canada	3.00
Foreign	4.00
Single Copies	40c

Make Checks, Money Orders, etc., payable to Chilton Company

Change of Address—Subscribers desiring their address changed should give the old as well as the new

The Commercial Car Journal is a member of the Audit Bureau of Circulations, the Recognized Authority on Circulation Audits

CURTIS CLUTCH DISCS



CURTIS Steel Clutch Discs are furnished in high carbon or soft steel, plain or slotted, flat or formed, unfinished or ground and polished, tempered or untempered—any size.

WE are experts in the manufacture of custom-built clutch discs of precision. We know exactly what is necessary to satisfactory performance in automobile, truck or tractor service.

By concentrated effort and intensive skill we have over a period of years developed the clutch disc business to a plane not approached by any other manufacturer.

We have solved many perplexing problems. We are in a position to give expert advice as to your particular needs.

Curtis Clutch Disc Co.
1507 Kienlen Ave. St. Louis, Mo.

CURTIS — CLUTCH DISCS — ST. LOUIS

Just Enough Hardening

☆☆☆U☆S☆HAMMERED☆PISTON☆RING☆CO☆IRVINGTON☆N☆J☆☆☆

Between too hard an outside bearing surface and one that's too soft, there exists an exact degree of hardness that is correct.

The inventor of the United States Hammered Piston Ring discovered this degree. He created a special, patented hammering process that gives the ring uniform radial tension without hardening or softening too much the outer bearing surface.

Too hard an outside surface crystallizes or fails to become properly elastic. Too soft a surface laps in quickly and soon wears, opening up at the ends.

The United States Hammered Ring has just enough hardness. It has the correct tension and maintains it. Every ring is guaranteed.

If you are looking for the super piston ring, ask us to send you more information.

U. S. Hammered Piston Ring Company
1206 South Grove Street Irvington, N. J.

U. S. Hammered Rings Used Exclusively by

Oakland	*Willys-Overland*
Vim	*Cadillac*
White	*Cunningham*
Kissel	*Cleveland Tractor*
Peerless	*Metz*
F. B. Stearns	*and many others*
Winton	

U·S·
HAMMERED
PISTON
RINGS